# NATURE MAGAZINE

MARCH 1932 35¢ VOL. 19, NO. 3

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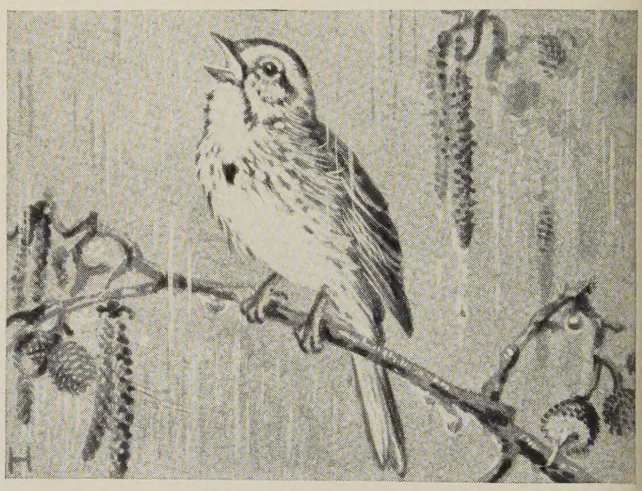

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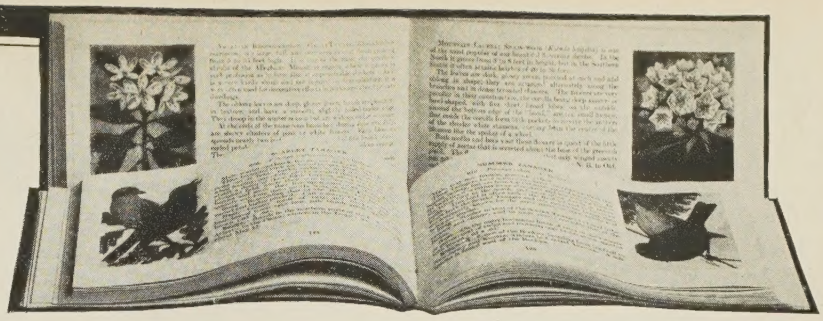

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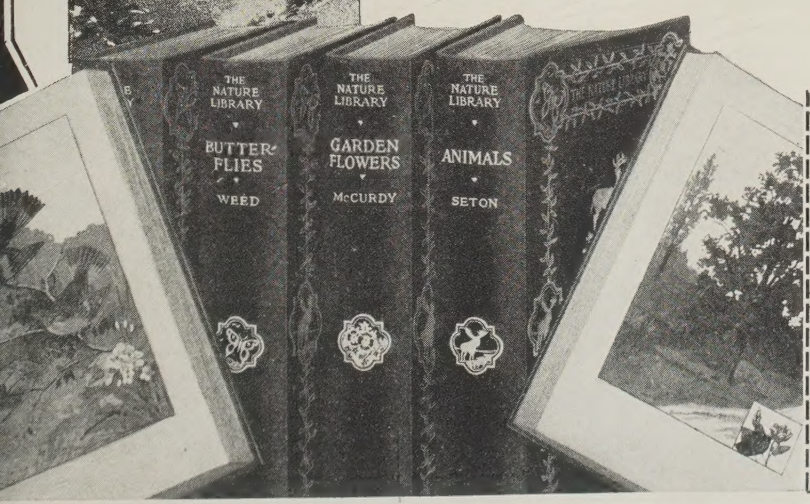


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## What Makes the Picture When You "Click" the Camera Shutter?

*This is written for those who would like to know something about that magic material we use in our cameras to make pictures. Lack of space makes it necessary to give but a brief account of how the light-sensitive film is made.*

Have you ever wondered just what the magic is, in camera film, that makes it possible to record an image and perfect likeness of little Betty or to capture the beauty of a landscape by the mere click of the camera shutter?

The lens, as we know, forms an image of the object or the scene at which we point the camera, and projects that image onto the film at the back of the camera. Let's see now just what the "magic" is in the strip of film that *records* the picture. By looking at the "bottle chart" we see the various chemical ingredients that go into the manufacture of film.

*The Transparent Base*

The base of all films, whether used for "still" or motion pictures, is cellulose, and the particular variety of cellulose used is cotton. This cotton receives a chemical treatment, followed by very thorough washing, so as to remove all impurities, and after drying is then ready to be treated so as to render it soluble in solvents for the production of the transparent film base.

The purified cotton is next treated with a mixture of nitric and sulphuric acids which renders it soluble in alcohol. This changes the cotton to what is technically known as "cellulose nitrate." The cotton, obtained by this treatment, must again be given a very thorough washing with repeated changes of water to remove all traces of the acids.

After this washing or purification treatment, the cotton is ready to be dissolved in solvents by thorough mixing, and wood alcohol is one of the chief chemicals employed to accomplish this. The solution which results has the consistency of syrup, which is pumped through mechanical filter presses to render it absolutely free from all dirt, or foreign particles.

Extreme cleanliness is necessary in every step in the manufacture of film to protect the picture taker from getting specks or spots or other blemishes on his pictures.

The solution, known as "dope," is now glass-clear and is poured on the surface of great heated, polished wheels or drums, and thus the sheets of film support are formed.

*"Buried Treasure"*

As mentioned last month on this page, silver is the active element in the sensitizing material, called the "emulsion," with which the film is coated—the magic material that brings you a negative. Pure silver bullion is dissolved in nitric acid and silver nitrate results. Other ingredients of the emulsion are potassium iodide, potassium bromide, and gelatin. The "buried treasure" of silver is, however, the thing that is sensitive to the light that comes through the camera lens and records a latent image which is eventually brought out by development in certain solutions.

*Gelatin Holds It All Together*

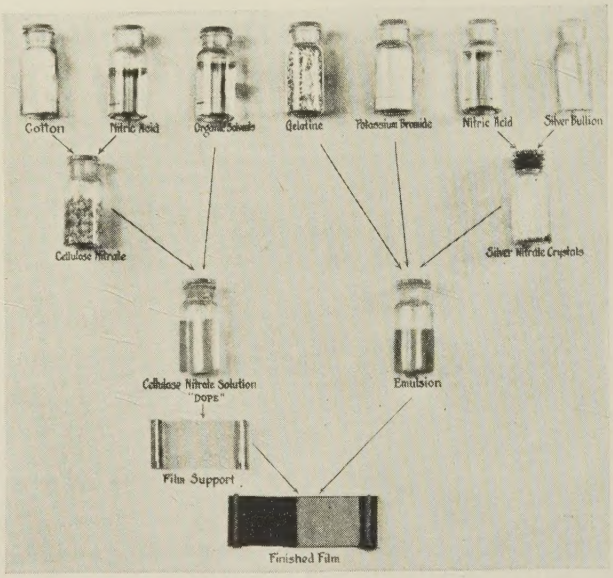
Photographic gelatin is prepared from calf skins. Bromide and iodide solutions are carefully mixed with it. To this mixture, heated to the correct temperature, is added the silver nitrate solution. The sensitive silver salt is held in suspension by the gelatin, and hence receives the term "emulsion."

After the film is coated with the light-sensitive emulsion it is carried in large loops through chilling rooms to set and harden or become "conditioned."

The film is then cut to necessary widths, spooled and boxed, ready for your camera, whether a "regular" or a movie outfit.

It is interesting to note that this magic strip called film is derived from the vegetable, mineral, and animal kingdoms.

EDITED BY ROBERT T. LOWELL

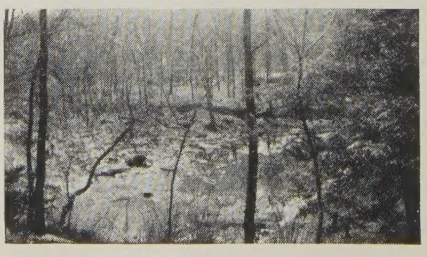



CHEMICAL STAGES IN THE MANUFACTURE OF FILM

How to Follow the "Bottle Chart"

*The cotton and nitric acid make cellulose nitrate. Cellulose nitrate with the organic solvents makes cellulose nitrate solution which in turn is formed into sheets, making the transparent film base or support.*

*Next come the chemicals that make the light-sensitive emulsion with which the support is coated. Gelatin and potassium bromide are combined; these with silver nitrate (which is formed by the combination of nitric acid and silver bullion) make the light-sensitive or picture-recording emulsion which is spread on the transparent film support.*



## A Glossary of Photographic Terms

*Several readers have asked that we print a glossary of photographic terms. Here is the start, and we shall continue the list in the April issue. Only words that are in use by the amateur will be included, though the editor will be glad to give, through correspondence, definitions of others, or supply information on any photographic subject desired.*

**Abrasion Marks**—on prints, irregular scars or scratches caused by friction.

**Achromatic**—colorless, hence applied to a lens that focuses the blue rays (which are quickest to affect film) and the yellow rays (which the eye sees) together.

**Actinic**—the kind of light rays that affect films, plates and photographic paper.

**Anastigmat**—referring to a lens—free from astigmatism, therefore capable of focusing vertical and horizontal lines with equal sharpness.

**Aperture**—of a lens, that portion through which the diaphragm stop allows light to enter the camera (*f*.6.3, *f*.11, etc.)

**Astigmatism**—inability of a lens to render vertical and horizontal lines equally sharp.

**Composition**—the arrangement of objects in the picture for agreeable effect on the eye.

**Contrast**—the difference, in grayness between light and dark parts of a print or negative.

**Contrasty**—descriptive of a print or negative that is harsh, with light parts too light and dark parts too dark.

**Covering Power**—the ability of a given lens to produce a sharp image over a given size of film.

**Definition**—sharpness of the image in a print or negative.

**Dense**—applies to a negative that has been over-exposed or over-developed and thus left with an image in which the deposit of silver is thick and relatively opaque.

**Density**—degree of opaqueness in a negative.

## Newsy Notes

### Literature on Request

A practical flash bulb reflector to give maximum light from Photoflash Lamps is offered complete with batteries for $1.00—including mailing charges anywhere in the U. S. A.

The Kodak Company recently placed on the market a new set of transparent oil colors. Complete instructions are furnished with them for the amateur.

All who are interested in the Leica Camera will welcome the new 90 mm. f.4 Elmar lens. It is useful for making portraits and also for taking all types of medium telephoto pictures. Circular on request.

"Getting Personal with Mountain Lions" is an intensely interesting lecture to the accompaniment of thrilling motion pictures made on Pack-Finley expeditions. For information on bookings, write to Extension Department, American Nature Association, Princeton, N. J.

A folding type, compact camera *without* bellows and with fast lens is offered by Herbert & Huesgen Co., 18 E. 42nd Street, New York. This "Cameo", a "Vest Pocket" camera, has other unique features. Circular is available.

## Constructive Criticism

The principal criticism of the picture reproduced at the left is that it contains no particular point of interest. In observing the print, the eye wanders about and finds no place upon which there is a desire to dwell.

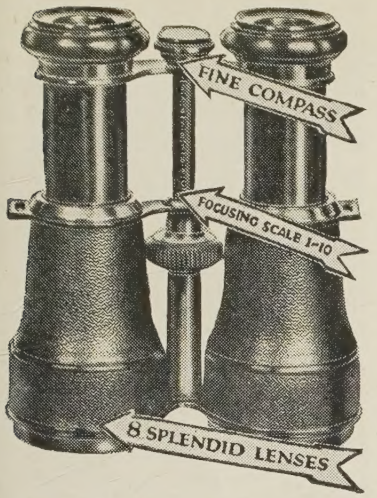
Possibly the snap could have been made from a slightly different position; perhaps with a larger tree on either side to give a "framing" effect or a more decided vista.

Usually a picture of this kind can be masked to yield a study of fair composition, but we see no chance here—maybe you can!

Of course, this photograph means much more to the author of it than to you or me, for he actually viewed the scene and can again visualize it in all its dimensions and colors, while we see it condensed on a flat piece of paper.

# MAGIC EYES

8 Lenses

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# NATURE IN PRINT

## About W. S. Blatchley

*Blatchleyana, a list of the published writings of W. S. Blatchley* (Nature Publishing Co., Indianapolis, 1930), is such a book as might well be prepared by any naturalist who has worked long in many fields. The author says that it has been written mainly as a time-saver for those who will follow him. We may first discuss briefly the features that illustrate this point.

The bibliography lists chronologically 197 books and papers published between 1885 and 1930, the latest the one now under review. The majority, perhaps, of these are papers on some branch of Entomology, for it is in this field, and especially as a student of beetles, that the author is most widely known; there are also many titles relating to fishes, amphibians, reptiles, birds, mammals, plants, and geology and archaeology. This variety marks him as an all-round naturalist of the old school, a type that is becoming rare. The list includes also several popular books, in which, to quote from a citation for the degree of Doctor of Laws, he is the "interpreter of Nature's beauty in woodland and meadow, by wayside and stream, in stones and in flowers."

Other features designed to assist the student in systematic zoology are the lists of new genera and species of Coleoptera, Heteroptera, and Orthoptera named by him, and of the one genus and 21 species that were named in his honor by others. Naturally these are mainly insects of the groups he has given most attention, but the fields of Conchology and Paleontology are represented also.

In many ways the brief account of Blatchley's life is the most interesting part of the brochure. He was born at North Madison, Connecticut, in 1859, but his parents moved in 1860 to Indiana, and with this state most of his activities have been identified. During his early years he attended the ungraded schools, and in summer assisted his father on the farm. In 1877 and 1878 a part of each summer was spent traveling on foot through the counties of west central Indiana, peddling notions, and a six-weeks' course taken in a normal school in the latter year afforded him a license to teach. His first teaching was in 1879 and his wages $1.50 per day. Another school in 1880 was followed by a second normal


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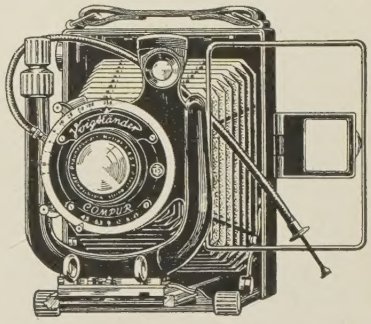

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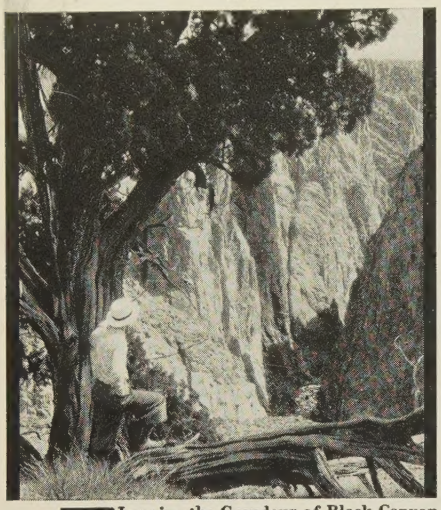

Imagine the Grandeur of Black Canyon by Noting the Gunnison River Far Below. Below: Quaking Aspen, San Isabel N. For.

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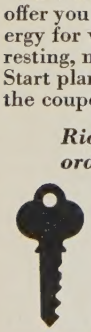

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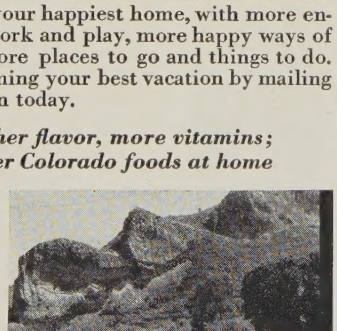

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course, and his next assignment brought him $2.00 per day.

In 1882, at the age of 22, Blatchley married, and during the next few years he worked his way through Indiana University, majoring in science under David Starr Jordan and John C. Branner. Thus he laid the real foundation for his future success. Later he taught science in the high school at Terre Haute.

From 1894 to 1911, Blatchley was State Geologist of Indiana. It was during these years that several of his popular books, and many of his more important entomological reports, were prepared in the intervals afforded from his official work, and perhaps as a means of relaxation. After his retirement as state geologist he spent most of his winters in Florida, engaged in insect collecting, and in writing. His travels also took him to Central and South America, and to Alaska, and his experiences in these countries are reflected in his published works.

The productive life of W. S. Blatchley shows what may be accomplished by one who, starting with few advantages other than a love for natural science, possesses an aptitude for hard work, and a determination to succeed in the face of difficulties.—E. A. P.

### Birds of the Stanford Campus

One of the most pleasing of the lesser bird lists that came out in 1931 is *Familiar Birds of the Stanford Campus* by John B. Price, published by the University Press, Stanford University, California. It is a small booklet of 71 pages, neatly done in handy pocket size, and is a guide to the birds more commonly seen about the college campus. It briefly outlines methods of outdoor bird study, and has a field key for the identification of somewhat more than thirty species, which are classified by size. A fairly full account of the characteristics and habits of 23 of the better-known birds occupies the main part of the book. Suggestions for several bird-walks are given, with a list of 73 species that one may reasonably look for. Several helpful books are listed to which the reader is referred for more information about the migrant species. There is a short chapter on Bird Banding, to which pursuit the author has devoted much time.

The book, which is well and pleasantly written, will fulfill its avowed purpose of aiding the local bird student.—E. A. P.

### How Useful are Birds

American farmers have been slow to learn that their best allies are the birds. They have only recently come to realize dimly that even the hawks play their part in the economics of agriculture. A publication which will hasten the completion of their education is *Usefulness of Birds on the Farm,* issued by their constant friend, the U. S. Department of Agriculture. It has been prepared by W. L. McAtee, and is replete with facts, figures and photographs to prove the case for the feathered insect destroyers. Among the predators, Mr. McAtee lists only the sharp-shinned, Cooper's and duck hawks, the goshawk and the great horned owl as detrimental to agriculture; there are more than 50 remaining species of hawks and owls, he writes, of value to man. Among the most praiseworthy of birds

# THE HEART OF ENGLAND

World famous Oxford is perhaps even more beautiful than learned. The view down the "High" is one of the sights of Europe. Balliol College, originated in 1260, possesses the oldest library in the Kingdom. For centuries on every May Day a Latin hymn is chanted from Magdalen (Maudlin) Tower. The Ashmolean Museum contains King Alfred's jewel, the lantern of Guy Fawkes, and the sword given Henry VIII as Defender of the Faith.

In Sulgrave Manor, close by, there is the greatest American shrine on English soil—the ancestral home of the Washingtons purchased by Lawrence Washington in 1539.

A priceless find is Banbury, famous for its cakes and ale. Malvern—in reality seven towns—is associated with William Langland, author of "Piers Plowman" and is center of the annual revival of Shaw's plays. Gloucester's "New Inn" was built in the fifteenth century. Standing near is the lordly cathedral.

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s the cuckoo, and the woodpecker is a close econd. One meal of a Brewer's blackbird, n one case he recites, consisted of 442 in- urious insects. Mr. McAtee's conclusions re based upon field and laboratory in- estigations, and are dictated, not by senti- nent, but by scientific fact. The publication s listed as Farmers' Bulletin No. 1682.

### Plants Where Glaciers Were

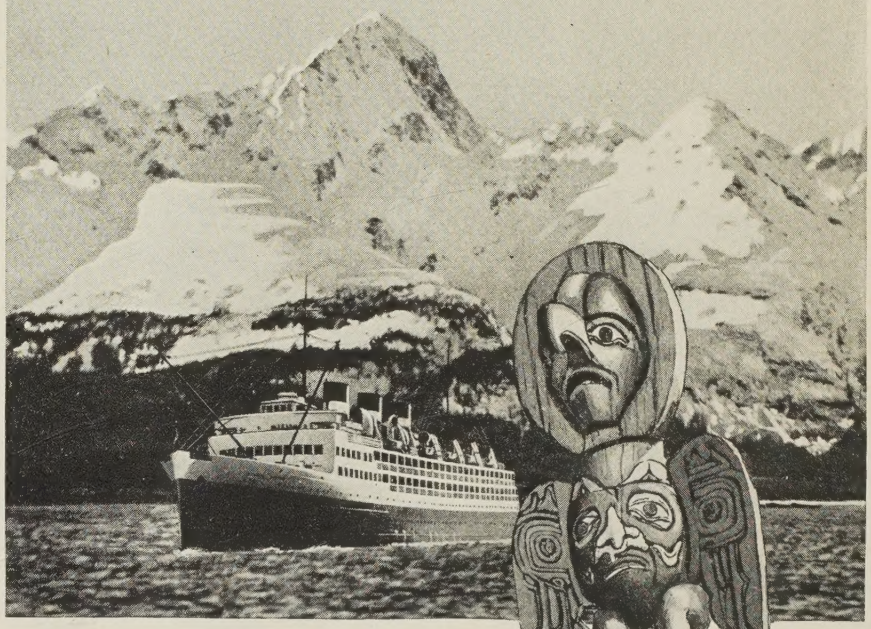
A tract of sand and swamp land devoid f habitation and almost impassable at cer- ain seasons of the year would hardly ap- ear to the uninitiated to be a rich field or the botanist, but a perusal of Willard N. Clute's *Swamp and Dune* will reveal ow fascinating such a region can be. Mr. Clute's study has taken place on the site of n old glacial lake where the plant life is till adjusting itself to the changing condi- ons resulting from the retreat of the ice heet. The vegetation varies to a certain ex- ent from season to season, and the element f surprise and discovery is a large factor n bringing joy to the plant hunter. The olume describes the seasonal changes which ake place, the general characteristics of the ora and the differences between the life n the lake bed and the vegetation of the urrounding country, and includes lists of he plants Mr. Clute found. The publishers re the Willard N. Clute and Co., of In- ianapolis, Indiana.

### Government and Conservation

The first comprehensive picture of what he Government is doing through its De- artment of the Interior to conserve the atural resources of America has been pre- ented in a delightfully written volume uthored by Secretary of the Interior Ray yman Wilbur and Executive Assistant Villiam Atherton Du Puy. It is entitled *Conservation in the Department of the In- erior* and reveals the great part this arm f Uncle Sam has played in building up the ountry. Its work in irrigation, in shackling he great Colorado River, in oil conserva- on, in enabling the Indian to find him- elf, in child welfare work through the ffice of Education, and in the creation nd maintenance of great preserves where mericans can see America in its pristine eauty is presented in both picture and ory. Particularly interesting are the chap- rs on the building of the Hoover Dam nd the National Park Service—the first elling the story of the greatest economic eclamation project ever attempted and the econd of the most important move in merican history to make citizens realize he recreational possibilities of their own ountry. Whether one believes that the overnment is becoming too paternalistic, r favors the view that it has shirked its esponsibilities, he must agree, after read- ng this book, that the Department of the nterior has functioned efficiently and well. We can heartily commend this volume to ll who have an interest in their Govern- ent. It is printed by the Government rinting Office for $1.

**Only Approved Books are Reviewed in these Columns**


# To ALASKA



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### Wrens Evict Hornets

The household of Dr. Francis M. Garver at Ivyland, Pennsylvania, is waiting anxiously for spring, to see if the pair of wrens that nested in an old abandoned hornets' nest above the front doorway during the springs of 1930 and 1931 will again choose their unique home. The hornets, writes Anna Creighton Scott, principal of the Elementary School at Leonia, New Jersey, built the nest during the summer of 1929. A pair of house wrens discovered it the following nesting season, punctured a hole in the side, and spent days carrying in the sticks to make a home that suited them. The next year, either the same or a very similar pair again took up housekeeping in the paper abode. While hatching the young, they became very friendly with the members of Dr. Garver's family, going in and out even though there were people sitting on the terrace within a few feet of them. Wrens choose odd sites, but this is the first instance, so far as we know, of their using a hornets' paper home in which to raise their young.

### Summer Soon Will Arrive

The turn of the seasons toward the warm days seems all the more certain now that the attractive Pennsylvania State College Bulletin on the Summer Session Nature Camps has appeared. Such a harbinger of spring is almost as sure a guide as returning robins and buds on the trees. This year, the camps will consist of two three-week periods beginning June 29 and July 19 respectively. They are located in the heart of the famous Tussey or Seven Sisters Mountains in Stone Valley, sixteen miles from State College, near the geographical center of the Keystone State. The camp site is bordered by stately virgin forests and beautiful forest plantations. Animal and bird life is plentiful; deer come into the camp site to graze, beavers are found along the mountain streams and bears are fairly common. The camp courses offer six college credits each, and include both preliminary and advanced Nature study work. Professor George R. Green of State College is director, and further information on the summer camps may be obtained from him at State College, Pennsylvania.

## The Milwaukee Zoo

Milwaukee, once famous for its beer, and recently in the public prints as one of the few cities with a surplus instead of a deficit, has a third reason for national attention—one of the finest zoos in the country. The Washington Park Zoo has been under the direction of Edmund Heller for the past three years, and during that time has increased rapidly. One of its latest additions is the Sheep Mountain, consisting of some five thousand tons of Lannon limestone, and two hundred and thirty-six feet in length and one hundred and eighteen feet in width. It is thirty-two feet high. On this man-made peak and over its precipitous sides with their narrow ledges and cliff-like proportions, play two adult rams, three adult ewes and three yearling lambs. Chief characters to be seen at the Zoo are Yacob, the six-thousand-pound hippo who has just recently attained his majority, and the pair of laughing jackasses or Kookaburras which serve as scavengers on all possible occasions. Incidentally, far from the least of the interesting features of the Zoo is the lively, popular *Bulletin* of the Washington Park Zoological Society which is written by one who evidently knows both his animals and his public.

---

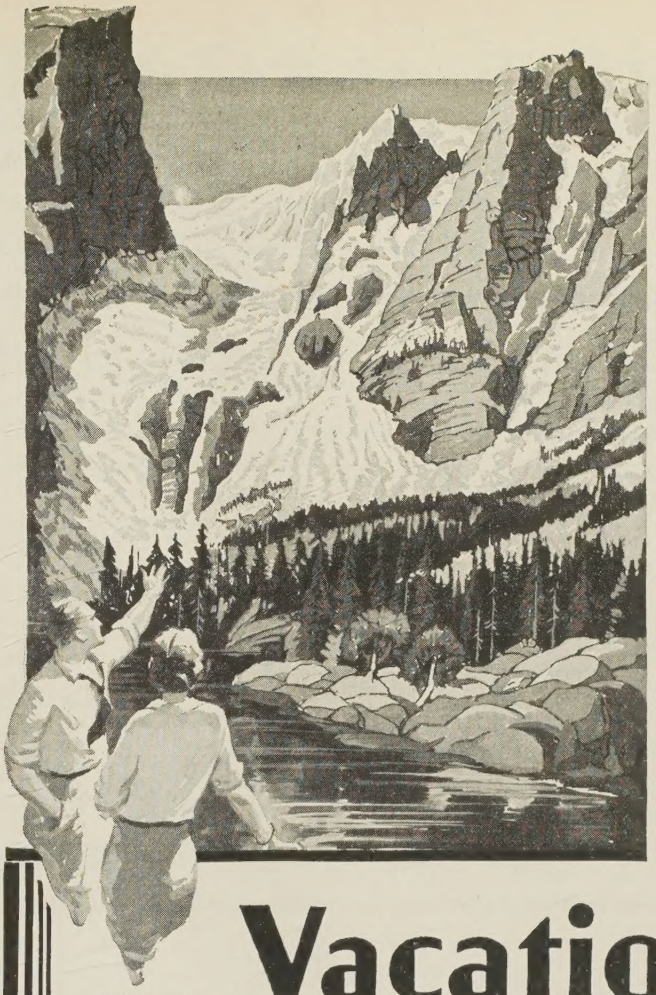
## Starling Menace

A letter to the New York *Times* urging the destruction of starlings to save song birds whose nests they are alleged to destroy, and to prevent them from becoming nuisances to city dwellers, has called forth a vigorous defense of these birds from A. H. Hellmer of Huntington, New York. Mr. Hellmer denies that starlings molest other birds, asserting that the iridescent, metallic gloss of the birds causes them to be mistaken for grackles, which are the real offenders. He also recites his own experience with the birds as indicating that they will not come near human habitations except in severe winter weather, when the ground is frozen and the birds are unable to find their natural food. He claims that the Europeans recognize the economic value of the starling better than we, and put up nest boxes so its tribe may increase. Mr. Hellmer is particularly vigorous in his condemnation of one method of starling control suggested by the New York *Times* correspondent—that of shooting them down with a shotgun. He believes that too few people can distinguish starlings from other birds to make this practice either effective or safe for the avian legions in general.

---

## For Cavy Lovers

An interesting little magazine devoted to the cavy, rat, mouse and other small animals and information and news about them celebrated its first anniversary last month. It is *The Hutch and Cage,* and is edited by Murray N. Donald of Oswego, New York. Mr. Donald is himself a cavy expert, and a lover of small animals and birds. While most of the articles are written from the professional breeders' standpoint, the amateur who is not interested in markets or shows will be able to keep abreast of the times by its perusal. We wish the publication many more birthdays as happy as the first one.

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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America


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# WHAT OUR WILD LIFE NEEDS

## An Editorial

ACCORDING to figures given by the Senate Committee on Wild-life Resources (report pursuant to Senate Resolution 246) the number of people who hunt and fish in fourteen of our southern and southwestern states has been estimated to be about four and one-half millions, and of those who play baseball, football, golf and tennis, as about five millions. The committee's estimate of the total number of those who hunt and fish in the entire United States is thirteen millions, and their expenditures during a year as fully three-quarters of a billion dollars. We will assume that the number of those who play the games mentioned, the country over, is not less than ten millions.

Why this array of large figures, and why the comparison? They are cited because we so often hear that one of the reasons our wild life is diminishing so fast is that there are not enough people interested in hunting and fishing. The reasoning back of this contention, if it may be called reasoning, is that the greater the number of hunters, the greater will be the interest in wild life and in its preservation.

Now the Wild-life Committee further states, and this is indisputable, that "there has been a decided and alarming decrease in the wild life resources of the country." And we would point out that at no time has this decrease been more evident than during the past decade, during which period the committee estimates that there has been an increase of four hundred per cent in the number of those who hunt and fish. These facts should be sufficient to prove, if any proof were demanded by thinking persons, that an increase in the number of people who are killing our game and fish is the very thing that is least needed by these harassed creatures. With the appalling diminution in our wild life that has occurred during the past few years in mind, we do not like to think of what would have happened if the millions of people who have been playing the non-destructive games had taken up arms, and had thus added their efforts to those of the killers.

But there is another side to the story. We note that "by far the greater proportion of Americans who annually go afield to enjoy our wild life resources and the associations of out-of-doors, do not either shoot game or catch fish for sport, but all of them, nevertheless, are interested in wild life. Their numbers are annually increasing." The total of this class of recreationists is not estimated, but at least forty millions—one-third of our population—is given as the number who in one year visited the State Parks alone. The amount of money spent by this non-killing class is also unknown, but "when figures are compiled they will dwarf any totals so far presented in connection with the activities of fishermen and hunters." So it looks as if even our commercial interests will not suffer if our wild life resources are better preserved. There need be no diminution in the number of our people who seek bodily health and mental inspiration in the wilds, and the same healthful benefits may be obtained if the guns are left at home. A number of our well-known citizens, formerly known principally as sportsmen, have abandoned the gun in favor of the camera, and assure us that the latter method of hunting animals demands more skill, and yields greater returns in health and pleasure, than the use of the gun. Furthermore, many dealers in firearms and other sporting equipment are gradually adjusting their business to the growing demand for apparatus of the non-killing type. An animal or bird can be killed only once, but may be photographed many times.

These are encouraging signs. There has always been an occasional enthusiast who has emphasized the greater enjoyment of observation and study of wild life, as opposed to killing it, and gradually the numbers of such people, and their influence, have increased. The havoc wrought by the gun has been a powerful factor in this changed viewpoint, for "blessings brighten as they take their flight."

May we not be encouraged to hope that the sense of esthetic enjoyment of our incomparable resources in wild life and its surroundings is increasing among our people, and that it may become such a potent force that the destructive influences that now threaten the very existence of our treasure may be halted in time. There is much of truth in the little poem, written by Sam Walter Foss, in which he says, in part:

I hunt for the thoughts that throng the woods,
The dreams that haunt the sky.

There are thoughts that moan from the soul of the pine,
And thoughts in the flower bell curled;
The thoughts that are blown with the scent of the fern,
Are as new and as old as the world.

So away, for the hunt in the fern-scented wood,
Till the going down of the sun;
There is plenty of game still left in the wood,
For the hunter who has no gun.

SEAHORSES MOVING SEDATELY ABOUT, SEEMINGLY
POSSESSED OF NO POWER OF PROPULSION

NATURE MAGAZINE

VOLUME 19 MARCH · 1932 NUMBER 3

# A MOTHERLY KNIGHT IN ARMOR

BY WILLIAM BEEBE

ILLUSTRATED BY R. BRUCE HORSFALL

THERE are three things of the sea that have been delineated by man more than any others—dolphins, mermaids, and seahorses, and there are three things about which we know almost less than any others—seahorses, mermaids and dolphins. I am sure that five thousand years ago some Egyptian or Chinaman or non-union stone mason of those days was daubing or hacking out an attempt at one or the other, and I know right well that at this very moment a young artist in a garret is drawing an original design of a pair of dolphins or seahorses with their tails entwined. I have awakened in a guest room where four walls revealed unending rows and columns of seahorses—so awful that I had to leap out of bed to avoid counting them and calculating how many more there would be if the window space had been filled in.

**The fascinating story of the seahorse is the first of two stories by Dr. William Beebe. They result from researches of the Bermuda Oceanographic Expedition sponsored by the New York Zoological Society, and will appear as two chapters in the book "Nonsuch: Land of Water", to be published by Brewer, Warren and Putnam of New York on March 18.**

I really believe we know more about mermaids than of dolphins or seahorses, for there is a splendid freedom of imagination which is engendered by uncertainty of the existence of anything—a freedom cribbed and confined by knowledge of actuality. Our medieval ancestors believed much more in mermaids than in other marine organisms, and I am sure that if a mermaid and a seahorse appeared for the first time at the same instant I should be much the more astonished at the latter.

My initial experience with a seahorse in Bermuda was from the point of a *lusus naturae* rather than as *Hippocampus punctulatus*. It was the first point of call of the *Arcturus* and we anchored at St. Georges in an afternoon's downpour of rain. I stayed only a few minutes on shore, went to a drugstore and bought the first thing I saw —a dried seahorse covered with gilt paint. Had I left it, its future would probably have been to collect dust on the what-not of some babbittian parlor, instead of which it performed a nobler function—that of a leavening climax after many hours of intensive investigation, when, in a sudden burst of amazement, Will Gregory saw a golden seahorse lying amid the scarlet and ebony treasures from a mile-deep haul in the Sargasso Sea. This achieved successfully, it was thrown overboard and as it sank into the depths of mid-ocean, I knew that the slow disintegration even of a dry and gilded seahorse would bring nourishment and joy of life to a host of diminutive scavengers, and then I remembered that my shilling was still on its way from one Bermudian hand or pocket to another, and I was pleased with the destiny of my first seahorse.

If we keep on thinking mermaid hard enough we will probably come across something not unlike such a lady and much more wonderful. Things work out that way quite often, as in the case of the seahorse. When Aristotle and the poets of classical Greece wrote of Hippocampus they had in mind a wholly mythical sea-monster, a dragon, half-horse and half-fish. They thoroughly believed in this piscine-centaur and so there soon swam into their ken a half-horse and half-caterpillar, and Hippocampus being only imaginarily "preoccupied," as our taxonomists would say, it naturally fitted the new natatory reality. Medicine evolving slowly out of witch-doctors and magic, and museums not yet having come in, any creature as strange as a seahorse would, in those early days, be considered

from the point of view of drugs. So we find attributed to it a marvellous list of panaceas. If I had only had a library of early chirurgeons on the *Arcturus* and a little more faith I would not so readily have consigned my dried seahorse to the deep, but would have burned it and consumed its ashes in wine and thereby have guarded against pains-in-the-side, or, had I taken it merely mixed with water, my canker and leprosy would have been alleviated. Best of all, had I stirred my Hippocampus ashes with oil of marjoram or liquid pitch and rubbed it on my bald pate a glorious head of hair would have resulted.

We may laugh at these prescriptions of old, but what except a feeling of shame shall we cherish toward an elaborate volume of seashore life, printed within three years, which states that Hippocampus is a primitive ganoid, that it lives to be a century old, and that it inhabits depths under great pressure! Before we ever smugly deride the ignorance or credulity of our ancestors let us stop a moment and recite the phrase "Remember Tennessee!"—a mortifying but healthful exercise. To appreciate to the full a seahorse we must make ourselves believe that we are the first to discover it—the initial playing of the Rosary, or September Morn fresh from the artist's brush, and all that sort of thing.

We require a seahorse, so from Nonsuch we send out a motor boat and pull a small dredge slowly through some of the growth of eel-grass in Castle Harbour. One, two, three or no seahorses may result, but usually we find at least one of the curious little beings lying quietly in the mass of trigger-fish, shells, grass, seaweed, and mud. He is as helpless as a prostrate knight in armor. I lift him and gently wash the mud out of his fin—mane I was going to say—and then let him slide down the submerged ways of my fingers and he is launched in a fresh aquarium. He rights himself—not like other fish, but vertically, turns his eyes from left to right, and glides slowly away. He seems to have no visible power of propulsion, but it is the invisibility of an airplane propeller—the fin on the back has become a dim, thin haze, its endless rippling web pushing back against the resisting water. The aquarium is a narrow rectangle and the seahorse traverses one long side, then a short end, and rests. And this first journey drives home a simile that needed just such an impetus; much more than the head of a horse, our Hippocampus resembles the knight of the chess-board, and his first move in the aquarium has been a knight's move—two squares ahead and one to the right.

It is well, however, to get rid of the horse idea altogether, and watch and learn to like our fish for himself. I put in a branch of seaweed and the long tail feels for it and coils about it with the grip of a chameleon. The next person who comes up to look cannot at first find the seahorse—he has begun to lose his identity. As we watch, this continues—he shifts from dusky brown to a pale neutral color and then again to dark, this time green, and Hippocampus is fairly within the protective cloak of seaweed sanctuary. He has gone vegetable and has taken upon himself the easy load of seaweed dangers and the very considerable advantage of algal immunity.

I reach down and gently swing the weed back and forth, and still another trick is sprung—the little creature sways both body and head loosely to and fro in rhythm with what to him are the swells of ocean. On the tips of the knobs and spines of his armor are numerous, long bits of frayed-out filaments, and these wave about and importantly disguise his zoological reality.

So here we have the seahorse and his niche in the world, balanced and weighed in the scales of life and death and found on the whole good. From snout to tail he is encased in bony jointed rings—one ring to each backbone, and while it slows him down almost to snail-pace, yet it serves to protect him from small predaceous crabs and other enemies. To carry about such a complete armor requires delicate adjustments, one of which is a large swim-bladder filled with gas just sufficiently buoyant to hold him in hydrostatic equilibrium. If, through accident, his inner ballon is punctured and the merest pinpoint of a gas bubble escapes, gravity seizes upon him, he sinks helpless to the bottom, there to remain until his wound be mended, or until Nemesis comes along on legs or fins.

Even for the seahorse in perfect health and strength there are waiting scores of hungry mouths armed with great cruel teeth that would crush him like a nut. Against these he builds up the sea-weed defense—of haunt, color, pattern, shape, movement, and in addition he even has an unpleasant odor—or to water creatures, taste. His tail fin—most valuable of all for progression—is gone and instead he twines like a tendril. His life is lived at lowest output of energy, a semi-sessile pseudo-crinoid of sorts, almost, we might think, on the way to the fixation of barnacles. But this is not degeneration, it is adaptation to a safe environment, and as we go on to study Hippocampus we realize that he need have no envy for the swift herring or the voracious dolphin.

It would seem that in the matter of food our seahorse must desert the quiet, patient elementalness of seaweed, and dangerously revert to fish activity. But here again Nature has worked out a most ingenious plan. For such a vegetative existence little nourishment can be needed, yet we have a carnivore that must have food. Resting on a frond of weed in the aquarium is a tiny crustacean, one of the untold myriads that inhabit all the seas in the world. The seahorse has also seen the copepod, but he wishes to keep me under surveillance as well. Slowly he swims nearer and nearer, and peers ahead with the comic intensity peculiar to short-sightedness. He turns sideways, and now the approach is still slower and he accomplishes two things simultaneously—one eye is cocked forward, gazing steadily at his victim, the other is twisted far back, never leaving our person. It was fair disconcerting and rather disturbed my own concentration. He throttled down his little push propeller to lowest speed, and the slowness of his advance began to approach the rapidity of the growth of his seaweed. Then he went into reverse, with no change that I could detect in fin ripples, and I looked and found that the copepod had vanished. I was certain that it had not swum away, the seahorse had made

no snap or bite in its direction, and I was completely confused.

It was a long time before I had another chance to be in at the death after a seahorse's stalk and this time I knew rather than saw what happened. It was in a small hand aquarium and against the glass floated a score or more of fish eggs that had come in with a surface haul. I was lucky enough to get a flat-field eight-diameter hand lens in position without causing the seahorse to shy. I watched without a wink and I saw the mouth of Hippocampus open wide, whereupon one egg after another simply was no longer where it had been an instant before. A flicker—and I knew that an egg had been sucked with amazing speed from a distance into the tube mouth, but my senses were too dull, my rods and cones too human-slow to register such bullet speed. Then the reason for it flashed upon me and I saw how, even in its pursuit and capture of living prey, the seahorse still plays the role of a vegetable. The cheek of this fish is formed of one large bone, the opercle, and is fastened by strong muscles directly over the gill-openings. There are no clogging gill-rakers or teeth or tongue, so that a sudden lifting of this great pair of valves induces a mighty influx of water, sufficient to drag with it at lightening speed any living creature in the path of the waterspout.

I have never seen the courtship of seahorses, but it is described as most amusing, the marine stallion shaking his head and moving swiftly around the female. I was about to pen some light, casual phrase about all that was lacking was to have him paw the water and neigh, when I came across an account, which, as so often happens, made considerable sense out of a meaningless joke. For it is recorded that by cunning movements of the lower jaw the little fish can produce a loud snapping that increases in volume and frequency as the season of courtship approaches. They have even been known to call and answer one another when confined in separate aquariums.

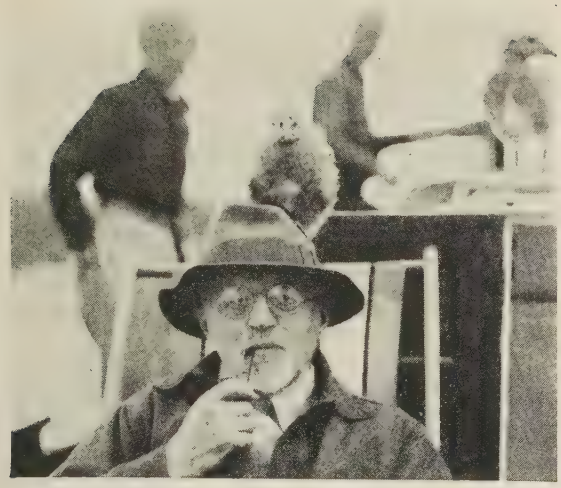
We might reasonably suppose that now we had exhausted the little bag of life tricks of a seahorse: remains only to record that the eggs are deposited and hatched, the young grow up and the eternal cycle starts another turn. But we are only at the beginning. Hippocampus is to prove that for sheer interest the last fact may be first, that a psychological reverse may make all physical shifts seem trivial, that what would be abnormal in ourselves has become usual and general in seahorses, and (what in science is almost a truism) that to the most dramatic phenomena we can often ascribe no primary reason or ultimate value.

We left the male seahorse doing his best to charm his mate, curvetting about, rippling his mane, snapping his jaws. The climax comes when she approaches and the two little creatures, rearing high, meet in mid-water. By the rules of sex throughout the ages, at this moment the eggs should be fertilized, but apparently the race of seahorses is bound by no rules. At the moment of contact, one or several eggs pass from the ovary of the female out into the water, and by some instinctive bit of magic are slipped into the orifice of a pouch, which, like the pocket of a kangaroo, is suspended in front of the male. What we mistook for evidences of an unusually heavy meal is something far otherwise. Again and again the female swims up, and egg after egg is produced and passed between them. So our generous male was wooing not only for marriage but for the custody and care of prospective children. The last egg is tucked away and without a "Cheerio" or backward glance, the bride turns and swims off, to the work or play or meditation on life which occupies a lady Hippocampus—I know not, after this amazing, ten-minute honeymoon whether to call her maid, wife or seahorse widow.

Also without a thanksverymuch, or even a well-merited sigh of envy of his more fortunate brothers in the world, our seahorse—etymologically a woman—swims off on his life's path, with his pocket full of the hope of the next generation of sea-pasture equines.

If it is true that the eggs require four weeks to develop, then a fathom or two down, among the eel-grass and seaweeds of Castle Harbour, a certain seahorse was courted, married and deserted on a Saturday night, the sixth of June. On the second of July we seined him off our bathing beach. As he glided gracefully about the aquarium I saw he was a horse of unusual beauty. He was full grown—one hundred millimetres from snout to tail—or less impressively, four inches. His color was a brilliant seagreen, darkened on the back, but the cheeks, chest and pouch were aglow with this beautiful shade; his eyes were blazing gold, cut four square by lines of alabaster; his neck was arched and proud as that of a thoroughbred Arab. The pectoral fins were long and wide-spread like wings, and the graceful body gleamed with a host of white dots, streaming out into constellations or concentrated into galaxies—good reasons all for calling him Pegasus.

His pouch was unusually (Continued on page 186)



ONE OF THE PARTY'S GULL MASCOTS
The sea-going chapeau of Dr. Charles H. Brown provides a convenient resting place

A STRANGE DANCE ON THE DECK
The two young sea gulls perform feats of deftness for the amusement of the party

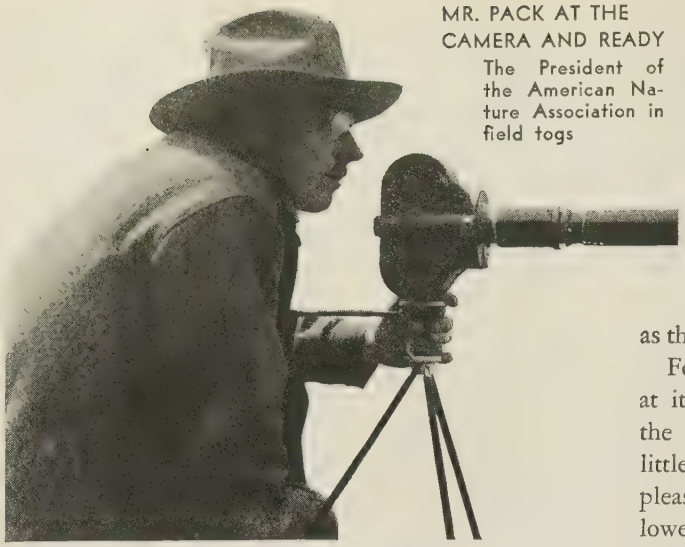
# DIGGING FOR BIRDS

## BY ARTHUR NEWTON PACK

PHOTOGRAPHS BY WILLIAM L. FINLEY AND THE AUTHOR

SOMEHOW or other, on my hands and knees, I managed to crawl up that cabin stairway. It seemed to my disordered mind that there might be some ray of comfort in dying in company rather than alone. Faintly I recognized Mrs. Pack and two or three other members of the American Nature Association's party lying flat on the cabin floor. Smash! Over went the water pitcher on someone's head. The drenched recipient of the deluge only rolled over to get out of the way. Crash! The heavy tripod of my motion picture camera broke loose from its fastenings and toppled over, missing my head by not more than an inch. I remember distinctly that I only groaned. It was now early afternoon. The storm had been getting heavier ever since daylight, and the *Westward* was not due to make Forrester Island until ten in the evening—and this assuming that the storm did not hold her back still further. Dr. Brown staggered by. He was still able to use his legs, which was more than I could do. "Doctor," I called, "if you can get to the pilot house, tell the Skipper I think we had better run for shelter behind Dall Island and give up Forrester for the present." With this tremendous effort at directing the expedition, I once more collapsed on the floor. A moment later the *Westward* gave a great lurch and then began to roll widely, but the pitching had eased a little. Evidently, my message to the Captain had been delivered and the course was changed. Four or five hours later, when the yacht ran under the lee of Dall Island, the passengers began to sit up and realize that this was not

VIEWING THE SEA PARROT HEAD ON
This is Polly, the Skipper's pet, whose orange beak and golden-yellow plumes give her a tropical aspect



MR. PACK AT THE CAMERA AND READY
The President of the American Nature Association in field togs

death, after all, although some had hoped for such release.

It had been our intention to make a run of one hundred and twenty miles straight by sea from the mainland at Prince Rupert, British Columbia, to Forrester Island, a sea-bird refuge administered by the United States Biological Survey, and one of the most outlying of all the islands of southeastern Alaska. Thanks to the performances of the misnamed "Pacific" Ocean, it was nearly three days before the eighty-six-foot Diesel yacht, *Westward,* with our party on board, achieved her destination. Forrester Island affords practically no harbor. When the wind is from the west there is refuge on the eastern side, but never any cessation of the rolling swell. Captain Dykeman found an anchorage, after careful soundings; and, after lunch, the camera hunters with the small outboard motor boat started out to explore the coastline and search for bird colonies. From our anchorage we had already had our first glimpse of tufted and horned puffins, those parrots of the sea; and all the rocks were well lined with gulls and cormorants. Now, as we purred swiftly along the rocky shore, little pigeon guillemots with red legs took off from the heaving swells in front of the dancing boat or dived noiselessly beneath the surface. A pair of bald-headed eagles screamed at us from their lofty perch in the top of a dead fir, while two younger eagles circled about. The frowning shores were steep and precipitous, with bare cliffs rising about thirty feet. Above them showed grassy banks honeycombed with the open mouths of burrows where the puffins lived. So long as the swells continued, no possible landing place offered.

Forrester Island is four and one-half miles long, and at its upper end breaks off into tumbled rocks where the swells from the open ocean dash into spray. Our little boat rose and fell, but with a motion far more pleasant than the long roll of the *Westward.* At the lower end, between Forrester Island and Petrel Island, is a narrow opening, and nearby a sort of rockbound bight with a barrier of kelp. This might afford a chance to land. The Skipper drove the boat towards the narrowest place in the kelp barrier, raised the outboard engine, and we coasted through, while one man grabbed the oars. Then followed twenty minutes of juggling with the swells. Stern first, the boat would approach a low rock and, at the proper instant, one person at a time would jump for shore; then more juggling followed until another lull in the swells came. At last all of our little party stood on the rocks with the cameras safely beside them, and the Captain set about the task of anchoring the launch clear of the rocks. It was necessary to fasten her both bow and stern, the stern to an anchor and the bow to the shore, and this was no easy task. After that the

SURVEYING THE PASSING SCENERY
The two young gulls make themselves quite at home about the Westward

MURRES PERCHED ON THE ISLAND EDGE
Their black and white plumage makes them stand out against the gray and brown background of the rocks

man who anchored the boat had to get ashore.

Meanwhile, I stalked some oyster catchers whose black bodies, red bills and pink legs offered an intriguing subject for the camera. Soon we started inland, to sink shoulder deep into a thicket of salmon berries and fight a way through it into a little saddle where the stunted balsam firs shaded out the undergrowth. The fir-needled duff of the forest floor was here honeycombed with little holes, and our feet went through at disconcerting moments. To us, who had never thought of digging for birds, these holes were a riddle, but Bill Finley at once threw himself on his stomach and began to dig like a terrier. Presently he drew out his arm with his fingers firmly clutching a sooty-colored bird about the size of a small dove. Its long wings were crossed over its tail, and its beak was surmounted by something that the Skipper called a nozzle. "It's a petrel!" Finley shouted. "I knew I smelled them somewhere, but I never knew them to burrow in a thicket like this." Petrels—birds of the open sea; birds of poetry and storm—and here we were digging them out of holes in the woods! It did not seem right. Finley identified this specimen as a Beal's petrel. We photographed one mother and then let her loose. Like a bat, she seemed hampered in the daylight and crashed against the branches. Yet we knew that these birds came in and out at night and flew far to sea, returning again to find one tiny burrow in the ground among a thousand others. Further digging uncovered more nests, each with a single white egg.

Through more thickets, out into the open, fighting through salmon berries again, we struggled to the ocean side of the little island, where

MURRE ON THE WING

The camera catches the interesting posture of this western sea bird

THE SKIPPER HOLDS HIS PET

But he is careful to keep his nose out of range of its beak

sheer cliffs offered their gray faces to the roaring waves. Puffins circled above us, and, on a high ledge, a colony of California murres squatted, each atop her single, top-shaped egg. Resplendent in their dark coats and white waistcoats, they mimicked the penguins of the Antarctic on a smaller scale; and, standing on their ledges, they resembled nothing so much as a college glee club about to burst into song. We made one or two false starts at climbing the cliffs, only to reach obstacles that were impassable without ropes. At last the Skipper and Finley decided to leave the cameras and, freed from impediments, to try to catch a puffin in its hole. Mrs. Pack followed, while I again started in chase of oyster catchers.

Presently there were shouts from above, and Finley returned hugging an outraged parrot. The puffin, black bodied, with heavy orange

OYSTER-CATCHER WELCOMES THE PARTY TO FORRESTER ISLAND

The most noticeable feature of this bird is a pair of bright pink legs, prominent against the rocks of the wave-lashed island

AND STELLER SEA LIONS, ALSO
Birds were not the only residents the party found on Forrester Island

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THE BILLS GO TO WORK
Engineer Bill and Photographer Bill turn to and dig for the birds

beak, wicked red-rimmed eyes, white cheeks and golden tufts of feathers for head plumes, resembles a bird of the tropics more than any other northern species. With that beak he can do considerable damage, as we were later able to testify. The Skipper presently came sliding down the cliffs with a similar bird, which celebrated its arrival on the beach by biting its captor in the stomach. The men had captured these creatures by reaching their gloved hands into the burrow and grabbing the indignant mothers as they came out. Finley's bird had a nasty disposition and refused to perform for the camera, but the Skipper's parrot, without even a confining string about her webbed feet, lay on her back between the Skipper's knees, cocked her head on one side and pawed the air in humorous distress. She seemed such a well-behaved pet that the Skipper decided to take her back to the yacht and show her to the rest of the party. Accordingly, we packed the cameras and plunged again into the salmon berries to recross the island. A low branch caused the Skipper to duck his head. It was the opportunity for which Polly had long waited. With a triumphant "Awrkk!", the puffin clamped its beak firmly onto the Skipper's nose and hung there. With a yell, Polly's captor yanked back his head and pulled Polly in the opposite direction. The nose came free at last, with two great bloody cuts adorning it from bridge to tip. Thereafter, the Skipper was more circumspect in his relations with puffins. There was no more

AN INTIMATE VIEW OF A GROUP OF THE RESIDENT MURRES
The members of the colony stood there like a college glee club in evening clothes already to burst into song. The curious top-shaped egg laid by these birds is plainly shown in the picture

hunting that day. All evening the *Westward* rocked violently at her anchorage, but by this time we all had our sea legs. We had learned that bottles should be laid on their sides and that other movables must be securely fastened.

Getting ashore was not so easy the next morning. The Skipper and the engineer went off alone in the dancing dinghy. They dropped an anchor off the rocks and ran lines ashore, so that the cameramen could have something to grab when the instant to jump came. Thus, we were able to get ashore on the

OH, WHAT A DAINTY DISH TO SET BEFORE A GULL

Two gulls, as a matter of fact, and the party's mascots regard intently the fish that has been providentially provided

THE MURRE IS MOORED

By no snare, however, but by the urge to stay on the nest

main island with only a moderate wetting. Almost the first burrow we encountered ran far back under a rotten log, but we pried the log loose and it bounded down the cliffs, to splash into the ocean. Then more digging yielded, as a prize, another strange bird—a rhinoceros auklet—whose name is derived from the rhinoceros-like horn on its beak. This creature has tufts over its eyes and on its cheeks, these white plumes contrasting with a dark gray head. She was duly photographed along with her dirty egg about the size of a chicken's egg. The hunters wandered on, overturning rocks and stumps like a group of bears looking for ants, and the wonders never ceased. High in the dense fir woods above the rocks we found literally thousands of small holes. Axes were wielded on roots, gloved hands dug with more vigor than ever. A long trench would open up, and there at the end, upon a nest of small twigs, would be sitting a bird the size of a full-grown pigeon, blinking strangely at the unexpected light. Once or twice we found little black fuzzy baby birds, which nestled warmly in the hands or pockets of the searchers. Later Finley and the Skipper returned from an expedition overland with two young Cassin's auklets—dark brown birds with white throats and breasts.

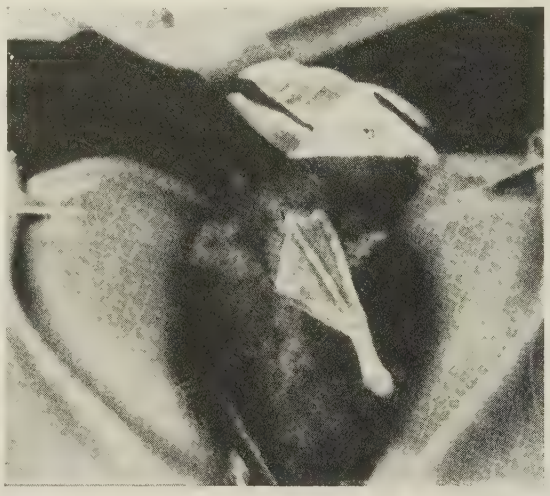
On the following day the wind had swung to the northwest and the swells rolled ever higher in our so-called harbor. It was too rough for our steel outboard launch, but the camera hunters, with Bill, the engineer, set out in the dinghy with a small outboard motor to cruise toward the northern end of the island. There we clambered like

MAKING A LANDING WAS A REAL THRILL

The trick had to be done by each alone, by taking advantage of the swell and leaping for land at the proper moment

human flies up a steep cliff where a pair of Peale's falcons shrieked and circled about us. A bald-headed eagle sailed by, and the falcons attacked him in mid air. All about were burrows. But what burrows! We now had shovel and crowbar besides the axes, but even with them the digging out was hard work. At last we unearthed one nest, only to find it that of another rhinoceros auklet. Above, in the thickets, we came upon the remains of Cassin's auklets eaten by the falcons, but no puffins. We had hoped to find here the nest of the marbled murrelet, which has only lately been discovered, but in this we were unsuccessful.

On the west side of the island, where the long waves from the open ocean crashed endlessly against sheer cliffs, it was clear that no boat could land. Our route must be overland—up the steep fir-clad slopes and then, if possible, down again. Cameras were placed in packsacks, ropes were coiled, and the heavier digging equipment left behind. Up we plodded, stopping now and then to rest our heavy packs. The slope seemed endless. An hour passed and then the roar of waves and the keen whistle of the sea wind suddenly smote our ears. We burst through the last trees and halted abruptly, fearsomely, upon the very brink of awful destruction. Here was no corresponding slope—our mountain had no other side—only a sheer abyss carved by the centuries of storm and stress into plunging nothingness. Far below the blue-green ocean beat itself into shattering spray and the cries of ten thousand birds filled the air. For a moment we stood, breathing deeply, thrilling to the elemental awfulness of Nature untamed. Then came the call of what we had set out to do. There below us, on a narrow, wind-carved ledge, were the high, built-up nests of pelagic cormorants, where sat the snaky-necked mother birds. Beyond them, on still narrower shelves, stretching out to the sheer plunging edge, clustered the murres. Their sleek coats of black and white stood out against the gray and brown of the rocks. Their single, top-shaped eggs lay all about beneath the feet of the struggling, pushing adult birds. Only that strange pyriform shape could keep the eggs from rolling off into space. And how could each mother possibly know her own?



POLLY PERFORMS

The sea parrot or tufted puffin performs antics when on its back

We crawled along a wind-swept ledge hollowed out like a half cave. Now that the material for real pictures was before us, even slippery footholds and crumbling hand grips seemed easy. The keen wind clutched in vain. Back and forth we made our way, stopping to take photographs in that wealth of material and against the background of swirling sea and sky. "Look!" cried Mrs. Pack. "Below, on the rocks—sea lions!" She worked her precarious way downward bit by bit while the Skipper repeatedly fastened and unfastened his rope to act as a brake. Then, as the little party approached, the watchful bull seemed to give the signal and with one accord the ungainly creatures flopped to the edge and dived off into the boiling waves. The bull himself waited. Was he courageously guarding his harem from the rear, or only too lazy and comfortable

ANOTHER DENIZEN OF INTERESTING FORRESTER ISLAND

A rhinoceros auklet that was pulled out of its burrow by a member of the party. The illustration shows the marked rhinoceros-like horn on the beak that gives the bird its name

to be stampeded? Two cameras were working now. "Action, action, please!" yelled Finley, and he waved his hat at the ponderous old sea lion. He looked around, emitted a gaping roar, and then hitched himself to the edge. One instant he poised, and then stretched out his sinuous neck and dived straight and clean into the sea. About him there the others gathered, yawping, until the combined sound of their cries drowned out the lighter swish and splash of the waves and only the hollow booming of the surf kept up a bass accompaniment to the turmoil.

I looked back. The fir trees on the edge of the abyss were far above us. The myriad startled birds we had disturbed circled overhead with indignant cries. It was time to start back. Without the Skipper's rope, I believe that I, for one, would be there still, but we scrambled and clung and slipped and held one another until at last, hot and panting, we reached the beginning of the forest. Then down through the trees our stumbling way led. Once more the *Westward* lay gently rolling on the swells. Next day we sailed for new adventures in inland waters.

This is the second of four articles by Mr. Pack on the 1931 expedition of the American Nature Association to Alaskan waters. The next article will appear in the April issue and tells of thrills photographing whales and of an unexpectedly fortunate experience in arriving just when a large part of the front of Muir Glacier elected to fall thunderously into Glacier Bay.

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# A CLEVER DECEIVER

## IT FOOLS THE BEES TO DISTRIBUTE ITS POLLEN

BY V. M. WATTS

OF THE orchids, dainty tribe of practical jokers, one of the cleverest is the magenta-flowered grass pink, *Calopogon pulchellus*. She invites a flying guest to dine and places before him artificial viands. She gives him scarcely time enough to discover the hoax before she springs a trap and tumbles him, head over heels, out the front door. As he goes she adds the practical touch to her joke, loading him with parcels to be delivered to the next temptress who may manage to lure him to her false banquet.

The equipment and technique of this pretty trickster are quite worthy of examination. In the first place the color of the flower seems to attract insects, especially certain species of small bees. On the bloom's lip, which in this case is upright, is the little tuft of golden hairs responsible for the name, Calopogon, which is derived from Greek words meaning "beautiful beard." Since the beard very much resembles a group of stamens it constitutes a special invitation to pollen-gathering insects.

THE GRASS PINK
An orchid that plays false with the bees

Now it so happens that the lip is delicately hinged at the base, and when the weight of even a very small insect is placed upon it a sudden forward and downward swing results, depositing the insect in an inverted position upon the column of the flower. The back of his abdomen receives an application of sticky stigmatic fluid. Then as he slides past the end of the column his weight ruptures the tiny pouches which contain the pollinia, or pollen masses of the flower. These little particles become attached by means of fine, gossamer-like threads to the sticky spot on his back, and our industrious little friend is burdened with a load for which he has no use and which he cannot discard until he again allows himself to be lured by false promises. One would think that if the bee had the intelligence for which he is reputed he would soon learn to avoid this species, but the same insect may visit many plants of the group within a short time. On the stigma of each blossom he deposits the pollinia that he received from its predecessor.

It is to this amusing but highly efficient method of pollen transfer that this unique plant owes its abundance in many parts of eastern United States, for like most orchids it is self-sterile. Unlike many insect-pollinated plants it repays the bee for his services in neither nectar nor edible pollen—nothing, in fact, but a tumble, unless, indeed, the guest considers himself rewarded by the beauty of his reception room, a beauty much appreciated by flower lovers.

THE BEAUTY THAT LIES WITHIN THE HEART OF AN ARTICHOKE

With delicacy has Nature fashioned this table aristocrat that looks thus when caught by the camera lens

# BEAUTY AND THE VEGETABLE

## AS CAUGHT BY THE SEARCHING LENS OF EDWARD WESTON'S CAMERA

BY RICHARD W. WESTWOOD

ILLUSTRATED WITH PHOTOGRAPHS BY EDWARD WESTON

IN THE lowly cabbage, the fragrant onion, the more aristocratic artichoke there is utility. They boast vitamins and nourishment, but are they beautiful? Offhand one would smile tolerantly and reply, "Well, hardly,"—proving the fallacy of the hasty answer.

In California, at Carmel-by-the-Sea, there is a photographer who can reply differently. Edward Weston can, in fact, refute the superficial response by the most tangible evidence to the contrary. He does so here, and in so doing opens up an opportunity for the lover of beauty in form to delve into new fields.

When he was sixteen, which was, in truth, some thirty years ago, his father, a Chicago physician, presented him with a square box camera. Forthwith there came heinous instances of hookey from school to photograph, followed by mental hookey from work in the wholesale department of Marshall Field's. A summer in California terminated with some "stake punching" for the old Salt Lake Railroad. This developed, oddly enough, into a dash at professional photography, which was, Mr. Weston says, "canvassing, house to house, with my camera photographing everything from family groups to funerals." Then a studio job; his own studio; success; deliberate destruction of everything he had done because he no longer

**No delicate fashioning in alabaster by the deft hands of the sculptor—just the beautiful symmetry of a cabbage heart made by Nature**

WITHIN THE HEART OF AN ONION LIES NATURAL BEAUTY

Line and movement are revealed in this photograph of the halved vegetable not usually considered as lovely

believed in it; Mexico and successful exhibits and finally wider recognition and his present work.

"I do not," Mr. Weston says, explaining the viewpoint so well demonstrated in his photographs, "wish to impose my personality upon Nature; to indulge in 'self expression.' On the contrary, my aim is, without prejudice or falsification, to become identified with Nature so that what I record is not an interpretation—my idea of what Nature should be—but a revelation; an absolute, impersonal recognition. What I seek is a presentation of the significance of facts so that they are transformed from things seen to things known.

"Fortunately it is difficult to become too personal with the impersonal lens eye. Only with effort can the camera be made to lie. So the honest photographer is forced to approach Nature in a spirit of inquiry, of communion, of desire to learn. The camera replaces inadequate, obsolete methods, as a vital way of recording and communicating one's understanding of the essential and living forces in the world today. Photography has its own technique and approach, which needs no concern with outworn forms, means or ends."

Thus has Mr. Weston worked in seeking an intimate acquaintance with the actual and innately beautiful forms of Nature. His is the understanding and observing eye. He has recognized the simple, exquisite beauty of Nature forms that escape most of us; this ability gives to his art an inestimably higher value than that of many.

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In the April issue we will present the first part of a special feature entitled "Birds of the States." The first part will be devoted to presentation of the story of the selection of the State Birds, written by Katherine B. Tippetts. This will be accompanied by the pictures of six birds in color and other color. The remaining State Birds will be featured in subsequent issues. The entire feature, however, will be available as a whole in a sixteen page pamphlet, magazine size, with colored pictures of thirty birds and other color. See Page 196 for further announcement.

A SAND HILL HORNET CARRIES HOME ITS PARALYSED VICTIM

ITS STING IS ENOUGH TO RENDER A CICADA HORS DE COMBAT

# THE STINGING SORORITY

## CONCERNING THE "LADIES" OF THE BAYONET BRIGADE

BY S. F. AARON

ILLUSTRATIONS BY THE AUTHOR

ARE THERE any more vivid memories of childhood than those of the berry picking and swimming expeditions that were turned into swift, ragged retreats by hornets, bumble-bees and yellow-jackets?

These "ladies"—for only the females have stings—have driven their bayonets home into many a tan-coated calf, and turned vacation days into days of pain and anger. And it is little wonder that the recipients of their attention have seldom ventured, either as children or adults, to pursue the interesting study of the why and wherefore of their stinging ways, but rather to avoid them most religiously. The loss has not been entirely to the attacking contingents, for the social stinging Hymenoptera, as are other creatures endowed with venomous stings, are far more fascinating than dangerous. Not all the entertainment they provide is contained in their hot tails.

THE HAIRY SAND ANT PACKS A PUNCH

Her red and black coloring is a warning to hungry birds. Three times natural size

Of species endowed with venomous stings—which, to be precise, are connected with poison-secreting glands, are separate from teeth or mandibles and are located at the posterior end of the body—the arthropods have by far the greater number. Of them the aculeate Hymenoptera, or ants, bees and wasps, being the sole insects distinctly so armed, are exceedingly more plentiful and better known.

The bees and wasps, both social and solitary, are the most important sisters in the stinging sorority. Certain ants possess protective stings, though, at least in North

America, they are far from seriously venomous, even when numerously cooperative.

Because he tackles every kind and condition it is the enthusiastic collector of the Hymenoptera who gathers very definite and comparative knowledge of insect stings. However expert he may be in poison-bottling his specimens from flowers or fruit, he can be sure to receive an extended thrust of an abdomen now and then, and if he is a student of the social habits and nest-building he runs a very large chance of maddening those active, four-winged ladies who are jealous of their rights. The solitary forms are never inclined to resent minor interference.

A FRIENDLY SOUL
A honey-bee ready to go into action. Note the curved abdomen

The relative power of the venom of stings is largely a matter of the physical condition of the victim and of individual susceptibility, much as between those who are affected by poison ivy and those who are not. The food of the creatures may also exert a decided influence.

A number of years ago, in order to test the effect of bee sting on the tendency to neuritis, thought by some physicians to be a cure, a curious-minded person I know caught a honey-bee on summer woodland aster and with forceps compelled it to sting him on the leg. The result, oddly enough, for he had often been stung by honey-bees without effects worth mentioning, was almost as serious as would have been the bite of a small copperhead or a prairie rattler. He was laid up with a badly swollen and very painful limb for three days and now, after seventeen years, that calf of his leg swells considerably beyond normal every day, and reduces at night when not in use. I doubt if the toxicology of this trouble is understood. Had the food of this bee anything to do with the severity of the poison? It is known that summer aster yields honey that is slightly bitter; could it have influenced the secreted poison? Then again, the sting was allowed to remain in the flesh and slowly pump out all of its poison. In most cases people who are stung instantly and usually unconsciously remove the sting, so comparatively little poison is injected.

The manner of stinging differs with Hymenoptera according to the position of the protruded weapon. The social wasps, *Vespa* and *Polistes,* and some of the solitary species, as the jug-maker, *Eumenes,* and the larger predacious forms, *Sphex, Pompilus, Pepsis, Sphecius, Ammophila* and their allies, give a direct thrust in line with the abdomen; the social bees and the solitary mud-dauber wasps make their thrusts at right angles to the abdomen, the sting being pointed toward the dorsum, making it necessary for the abdomen to be curved under so as to bring its upper surface against the object to be stung.

The bees do not constantly protrude their stings, even when captured; they flash them in and out repeatedly against the forceps. The wasps extend them for instant use, making constant efforts to sting. The mud-dauber when first captured tries to use its sting on the forceps, but finding the effort fruitless, it desists until teased. The stings of bees and solitary wasps are sheathed their full length; those of the social wasps are generally without these two-part scabbards and when not in use the stings are drawn into fleshy pockets above the muscle-covered poison sacs.

All insect stings are endowed with feelers that are apparently organs of sense. The sheaths of the bees act this part, with an evident function not unlike the palpi of the mouth parts. The nature of the object to be stung is ascertained by them. Bees held by forceps will not often try to sting any object that to them does not seem antagonistic, as an apple, a twig or leaf; but if a finger is offered there is no hesitation—on the part of the bee. After I had rubbed a smooth stick against my hand, that a honey-bee would not sting until it had the flesh odor, the bee readily tried to sting the stick, and a bumble-bee showed the same tendency. Forceps evidently seem antagonistic, or offer negative influence. The muscular action back of the sting is sufficient to force it through the toughest callosity.

THE HOTTEST WARRIOR OF THEM ALL
The bumble-bee, Bombus affinis, is slow to anger and ready to leave people alone, but when her wrath is aroused, woe to those who get in her way! One bee alone has been known successfully to ward off attack from the nest

We can understand the value to the hive, if not to the individual bee, in having the sting become detached and continue to force poison into the wound. Undoubtedly a bear, raccoon, opossum or skunk with a score or more of remaining stings continuing to pump and pain might be somewhat disinclined further to rob the hive of the contents, no matter how delectable the feast.

There is a very considerable difference in the venomous strength or power of bee and wasp stings. The virulence may be governed somewhat, but not entirely, by the size of the insect. The little swift-flying, burrowing bees, Andrenidae, cause no greater hurt than the

western agricultural ants. The very small sand-burrowing wasps, Oxybelidae, have such weak stings that not only can they hardly puncture one's finger, but when they do get through the thinner skin, the result is but a severe itching like that caused by a single pustule of poison ivy. These insects crush their fly victims with their jaws; their stings are evidently not powerful enough to put them to sleep.

Quite different are the little yellow-jackets, which not only are eager to sting when their nests are threatened, but inject enough poison to make the recipient fully aware of it. Yet I have known a toddling child to be covered by yellow-jackets and stung all over and hardly to be made ill. If half the number of honey-bees had been as attentive the baby would have died. There is an authentic record of honey-bees killing a crippled but healthy horse.

READY TO STING
The black, white-faced hornet, Vespa maculata, about to hurt

Far less severe than that of the yellow-jacket is the sting of the long-bodied digger wasp, *Ammophila.* It normally paralyzes caterpillars as large as itself, but this accomplishment marks the height of its powers. As though it knew the futility of its poison it cannot be induced to use its sting in defense of its burrow. The same may be said of the mud-dauber wasps, *Scelephron* and *Pelopæas,* and of the jug-makers, *Eumenes.* An occasional stab from these insects is felt by the careless collector, but can be considered of small and brief importance.

A PAPER NEST WASP ATTACKS
Polistes pallipes in position to do the most harm she can

The solitary wasps as a class and with only a few exceptions are not powerful stingers; their venom, while no doubt useful as a protection against many foes, seems to have been developed principally for the purpose of rendering their prey helpless. The caterpillar- and grasshopper-catchers rarely kill their victims outright, though frequently stinging them many times, and only about half the spiders caught and stung repeatedly by the digger wasps and the mud-daubers are killed at once. It is probable that the wasps withhold a portion of their poison, involuntarily perhaps, for they have an abundance of it. It is a fact that the insertion of a fine insect pin into the body of a spider will cause it to die quickly, so that in some cases, especially with small spiders, there would seem to be little need of poison for the wasps' purpose.

The so-called wood-boring wasps, *Trypoxylon,* which are not borers at all, but merely users of holes in any convenient substance, possess also very weak poison, as I well know from having had it demonstrated upon me from the insect net. As for the semi-social, stout-bodied digging wasps of more than medium size, *Bombex,* it is said that they get into something of a rage when their nest is hastily approached, but do not attempt to use their stings. On the other hand the little burrowing bee-catchers, *Cerceris* and *Philanthus,* sting with such virulence that their bee and leaf beetle victims are killed at once.

The gold wasps or cuckoo flies, Chrysididae, do not appear to possess poison glands; they rarely sting, even if taken by the fingers from the net. If defense is attempted it results in but a mere puncture like the deep prick of a fine needle. A similar stab is given by certain larger, non-poisonous Ichneumonidae.

No doubt the larger the insect the bigger its poison sac, but that does not seem to be the chief influence. We have an example of relative size and strength of venom as between the big sand hill hornet, *Sphecius,* and members of the hairy sand ant family, Mutillidae. These latter are, with the exception of the bumblebees, *Bombus,* the most virulent of all stingers. The length of their stilettos perhaps accounts in part for the severe result.

The sand hornet makes victims of the cicada, as is well known; the sudden cessation of the husky homopter's buzzing resistance after one quick stab attests to the deadly character of the poison injected. The Mutilla minds its own peculiar business, its bright red and black colors warning hungry birds not to touch it.

I have been stung once by each of these interesting insects, by the big sand digger on the thumb when she was going out of the net into a cyanide jar. The stab felt like the plunge of a red-hot needle; the bottle and lifted cork dropped, spilling the solution and liberating the valiant objector. But the hurt was not lasting and the member swelled but slightly.

I came into contact with the red and black hairy sand ant, *Sphaerophthalma occidentalis,* when beginning my active collecting efforts as a boy. There before me was a slowly running, gaudy thing that was some new kind of a hirsute ant and it was getting away toward a tangle of long grass. In that section there are no true ants that

A SPIDER CAREER IS ENDED

The digger wasp is seen injecting its moderately powerful venom into its prey

have stings; therefore, eager fingers closed on the creature. And unclosed! I hardly could believe the creature was not a whole and condensed bee hive. I flung it from me and it got away. I have collected many of that species and others of its near relatives since, but tweezers have been used, or else the specimens sought have been made to run into an open cyanide jar.

I once knew a child of seven or eight to grab a big red hairy sand ant just as I had done long before; the youngster was eager to get the pretty thing for me. The little fellow's hand swelled greatly and there was a decided lethargy for a time, but within perhaps an hour it had passed away. I can hear the boy's howls yet and never can that child be induced to be an entomologist.

The much feared builder of the globular paper nest—the white-faced black hornet, *Vespa maculata*—has been too much publicized. It is a fighter, but not very poisonous. Who frequenting the out-of-doors has not encountered with considerable trepidation this warlike insect and felt its jealous stab? Every bit as ready to fight as the yellow-jacket (I have had both attack when I came within three feet of their nests), the *maculata* is generally surer of its aim and swifter to thrust its discourager, thus too often constituting a temporary and local menace. Almost all other social hornets, wasps and bees take their time about striking; even the yellow-jacket will alight and crawl, looking for a favorable place to deliver its sting, but the black warrior strikes and thrusts at the same moment, making no mistake in landing on clothes or hats; she goes at once for bare skin or hair through which she can easily thrust her poniard. Too often she spots the eyes and drives for them.

Incidents nearly always more amusing than serious attend the defense of *Vespa maculata* against its chief enemy, man. It is surprising what enmity is felt toward a creature that is merely defending its rights and also to what extent these little creatures and all the stinging sorority sisters are genuinely feared. I have seen a young soldier who would face bullets and the stones of rioters quail and retreat in haste before one small hornet no longer than the end of his little finger, when it was to his advantage to brave the insects in order to gain valuable time in an important undertaking. I have seen a pugilistic mixer flee before a few hornets as though sure death stalked in his tracks.

The entomologist learns to regard these things more lightly because he has discovered that by deliberate motions and no act that could be construed by the colony as antagonistic he can approach and view their exterior goings and comings without danger.

On top of the often narrow prejudice and fear with which the stinging sorority is regarded it is refreshing to find incidents of the reverse. For though *maculata* may not often show herself a "friend of man" even though she "dwells by the side of the road" she really is very beneficial, just as is that other paper nest maker that builds without an external casing. For as catchers of flies and many other pests with which to feed her young these wasps are adept.

In Tuckaleechee Cove on the Tennessee side of the Great Smoky Mountains and at the very foot of Clingman's Dome there dwelt some fifty years ago a respected citizen, Major Tipton, veteran of the Mexican War. As a little lad I remember the hornets' nest that hung in his orchard and was greatly prized by him. Why? The Tipton family ate on an open porch where house flies

DESTROYING A CATERPILLAR

Another episode in digger wasp existence. The victim still lives, though stung many times

were normally annoying. But it is well known that these first paper-makers love flies as articles of diet and to feed their tender larvae. To watch a hornet swoop down and seize a hungry fly from a plate, or possibly from the spring-house-cooled butter is a sight that has not been granted to everyone, but if the hornets are plentiful and encouraged the process almost equals fly-screened enclosures.

This also teaches a fact that is universal: unless actually seized no stinging insect will show animosity away from the nest.

Lastly let us consider *Bombus*. Even the biggest hornets, the most virulent Mutillids, cannot quite equal those ever busy, deliberate, black and yellow, long-haired workers, the bumble-bees, for the amount or the effective strength of the venom which they can put into a wound.

Rather slow to anger, content with their own affairs, the bumble-bees of the many social species are regarded lightly because there are rarely more than two or three on guard at the nest, and not until the abode of the small colony is threatened by actual injury is there defensive retaliation. But when revenge is wreaked upon the aggressor, it is not sweet—for him.

Those related solitary forms, such as the carpenter-bee, *Xylocopa,* and the larger leaf-cutters, *Megachile,* are quite as poisonous as social *Bombus*. The manner in which a bumble-bee can reach an antagonist or trespasser, catch and cling to a vulnerable part and apply enough venom to more than satisfy any curiosity upon the subject is something to be long remembered and respected.

What Kipling wrote about the female of the species certainly applies to the stinging sorority. As no male bees or wasps can sting, they make no effort to defend the colony and ignominiously flee on wonderfully swift wings to seek safety. A cowardly act—but why try to protect the citadel when such sharp-bayonetted weapons attached to the other sex can so much more effectively gain victory? Why not put the undoubted superiority of the sex usually called gentle to advantageous use?

DISSECTIONS OF BEE AND WASP STINGS

Upper left, honey-bee, dorsal view; center, honey-bee, side view; right, bumble-bee, side view; lower left, paper nest wasp; center, mud-dauber wasp; right, paper nest hornet

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# BURS OF COMMON PLANTS

## NO. 2—THE COCKLEBUR

### BY SALOME COMSTOCK MILLER

**The second of a series of short articles on the clinging seeds that return with you from woodland walks.**

THE COCKLEBUR, another common bur, is unusual in that of the two seeds which it contains, one ordinarily sprouts a year later than the other. The burs are produced, not in heads as in the bur-marigold group, but irregularly in the axils of the leaves. There are several kinds of cockleburs, all of which have coarse foliage and burs similar to the one here pictured. One kind or another is common in almost every part of the United States. See which one you pick up on your walk.

THE COCKLEBUR OR BEACH CLOTBUR

A most effective device for the dispersal of the plant's seeds. It is seven-eighths of an inch long

THE MOTHER SHRIEKS HER DEFIANCE

With drooping wings and raised crest, she dares the photographer to do his worst

A SKYSCRAPER HOME IS SPIED UPON

Sixty feet in the air the blind was built, and privacy for the hawks was thereafter gone

# RED SHOULDERS AND THE CAMERA'S EYE

BY ALFRED M. BAILEY

THE majority of the birds of prey nest early in the spring. One of the common species of North America is the red-shouldered hawk, *Buteo lineatus lineatus*, which builds its homes from the Atlantic to the Great Plains, and from Florida to Maine. The northern breeding birds arrive in March when the woods are brown and bare of vegetation. Soon after, they begin to work on their abodes, and although they do not use the same site with the regularity of eagles, it is not uncommon for a pair of red-shouldered hawks to use the same crotch for several successive years. The nests are rather bulky platforms of sticks and twigs, lined with the bark of trees.

It was a cold day in March that we were plodding through the forest preserves of Cook County, Illinois, in the hope of seeing a few new arrivals from the south. The wind was chill and the skies were gray, while the dead leaves were moist underfoot. As we climbed a steep wooded knoll, a dark colored bird flushed from a nest high in the branches of an ash, and winging among the gray trees, disappeared in the distance.

We had been making motion films for the Chicago Academy of Sciences and were desirous of adding a bird of prey to our series. Here was a wonderful opportunity. The hawk's nest was sixty feet in the air, but it was ideally located for photographing, for there was a tree twelve feet to the east

in which we could build a blind. On April 4 we visited the site and attempted to erect a platform in the neighboring tree, but the long climb without branches was too much for our unused muscles. We did inspect the home, however, and found three eggs in the cuplike depression of the bark-lined platform.

Two days later we returned, armed with climbing irons and material with which to build a blind. A little platform was built and a small piece of canvas hung in place, so the old bird would have an opportunity to get accustomed to it before the rest of the shelter was completed. The camera lens was ten and one half feet from the center of the nest!

On the second week in April we again visited our hawk. The brooding bird was at home, but she flushed before we were within a hundred yards. We completed the blind and made motion films showing the barren woods of early April, and from the nesting tree I made studies of four beautifully marked, brown-splotched eggs.

SHE CAME ON THE NEST LIKE A SETTING HEN
The mother braves the human presence and broods once more

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PHOTOGRAPHING THE EGGS WITH A HAND MOVIE
Perched dizzily on a slender limb, the cameraman shoots directly into the nest

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WILLIE AT THE AGE OF TWENTY-EIGHT DAYS
He is about to feast on the garter snake a fond parent has brought him

Owing to the position of the blind, it was necessary to make all the photographs early in the morning. It was not until April 18 that I was able to return to photograph, and the day was overcast, with threatening rain clouds hovering low over the spring woods. I climbed the tree to my swaying perch, and then dropped a line; a friend made my motion camera fast so I could draw it to the aerial platform.

I entered the blind at 7:20 a. m. There was scarcely a sound to be heard. In the distance I could occasionally hear the high-pitched challenge of one of the hawks, but the forest itself was strangely devoid of life.

Anxiously I awaited the return of the hawk, for I was afraid the eggs would become chilled. The camera was pointed at the nest, and I watched through slits in

THE MOTHER HAWK AT HOME
A striking photograph of sunlight and shadow about the nest of the red-shouldered hawk

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WHAT IS IT ALL ABOUT?
That's what the newly hatched young wants to know, as the camera eye glints at him

the canvas for the first appearance of the bird. Suddenly, off among the trees, low over the ground, I saw the dark colored hawk gliding swiftly and silently toward me, the rufous color of the wings and the browns and blacks of the back harmonizing with the somber color of the leaf-strewn forest floor. It was the male, as was proved later when the female appeared, and as the bird flashed through the grim woods, the most conspicuous thing was the bright yellow cere of the beak. He flew rapidly and without hesitation, and then, sailing upward, alighted upon the nest without a glance at the blind. I held the motion picture camera steady over a little crotch and pressed the trigger, and as the machine began to whirr, the hawk raised his head quickly and locating the barrel of the lens pointed at him but a few feet away, he sprang suddenly into the air. He alighted, however, in a tree twenty feet away and called querulously for possibly five minutes, and then launching on wing, darted back upon the nest. His left wing was partly open and half raised as he walked to the center of the nest; he eyed the blind for a moment, and then, apparently oblivious to the noise of the machine, settled upon the eggs.

Motion pictures are worthless without motion, so, after taking the footage desired, I waved my hand from the blind and flushed the bird. He returned within a few minutes and alighted at the rear of the nest, this time all fluffed up like a brooding hen.

The first attempt to photograph the red-shouldered hawk marked the only time that both birds were seen in the nesting tree at the same time. Scarcely had I made the amount of footage I desired, when the larger female came in on silent wing, but with voice raised in strident shrieks. She dropped gently upon the nest, and at the same time, the male jumped from the eggs and flew swiftly away.

A PICTURE OF FATHERLY CONCERN
Fluffed up like a brooding hen, the hawk parent surveys his home and makes sure all is well

The succeeding days were full of interest, for I made many trips to the hawks' domain to study and make our photographic records. The old birds would return within a half hour after being disturbed, on cold days, but when the weather was bright and warm they did not appear at all solicitous. Then, when conditions were best for photography, I often had a long wait. Sitting upon an unpadded two-by-four, sixty feet in the air, is not a pleasant way to spend five or six hours at a time. I whiled away the

hours watching the various small bird migrants that were beginning to make their appearance. Creepers and nuthatches worked along the outspread limbs, and red-headed woodpeckers and flickers tapped noisily on all sides. The woods began to show a faint sign of green the latter part of April, and I noticed that the hawks had decorated their nest with small branches of leaves.

On April 27, I again returned to the blind. It was now more than three weeks since we had begun photographic operations, and I feared that the eggs were chilled and that the young were not going to hatch. The old one flushed wildly from the nest when we were one hundred yards away, and after I entered the blind I did not see or hear her for more than an hour. It was a beautiful day with a soft light through the changing woods and the brown leaves were hidden under a growth of pink-faced spring beauties. As I peered through the blind I heard the querulous call of a crow in a nearby tree, and, glancing that way, saw my hawk sitting motionless, eyeing the blind. Her pinkish breast, cut by shadows from the small branches, made her practically invisible against the sky. I watched her closely, and for an hour she merely made short flights around the blind without risking a landing upon the nest. She had been quiet all this time, but finally, apparently unable to stay any longer,

FRESH MEAT FOR THE HUNGRY
Occasionally the female flew home with a mouse in her beak

ed the tree of the blind. And good news awaited me. The old one had flushed as wildly as usual, but as my head came on the level of the nest, I saw half a cottontail rabbit decorating the edge. I saw three eggs still unhatched, and then—like a jack-in-the-box, up popped the fuzzy, white head of a youngster. On this day the old one returned in twenty minutes, but overhanging clouds made it impossible to photograph for over an hour. During this time the parent eyed the blind unblinkingly, but when light conditions were right I aimed the camera upon the nest and waved my hand from the slit in the canvas. The bird jumped to her feet, and with tail spread,

EMPLOYING AN ANCIENT TRICK
When an airplane sailed overhead, Willie would flatten out and lie motionless

she stood upon the gnarled limb of the oak on which she had been resting, and after challenging me loudly with her crest raised, she glided into space, alighted on the nest, and with feathers ruffled like those of an old setting hen, she dropped upon her eggs.

Winds that made my aerial blind sway to and fro and downpours of rain prevented further photographic work for five days, and then on May 4 I again climb-

THE SOLE SURVIVOR OF THE BREEDING SEASON
Did "Lonesome Willie" push his little brother out of the nest, or did some predator carry him off?

wings drooped, and head erect, shrieked her defiance. It was as beautiful a picture of a bird denoting power and grace as I have ever seen. She was not afraid—she was merely angry, and she took no pains to conceal her wrath. When she once more settled upon her nest she refused to budge, even though I shook the blind and called loudly. Finally, I tossed my hat in the air. The hawk spread her wings out over the nest and, looking down toward the ground, cursed heartily in raptorian language. When my gaze followed hers I sympathized with her fully, for my cap had lodged in the nesting tree, twelve feet under the nest!

She again settled upon her eggs and no amount of effort would make her move, so I pulled the blind aside and we eyed each other. She refused to fly even then, so I felt that she deserved to be alone with her brood, and I climbed down from my polished perch and left her.

A brief visit the next day showed another youngster in the nest—and the two eggs missing. The light was too poor for photographing, but I merely wanted to observe for my notes. A week later I again entered the blind. The woods were now green, and violets and anemones were giving color below; and as the green of the foliage increased, the hawks massed more green upon their nest. I was sorry to see that tragedy had occurred in my hawk family, for only one of the young now remained in the nest. Whether Lonesome Willie, as we named the survivor, had kicked his little brother out, or another type of accident had occurred we were unable to tell, but Willie served us well in the following weeks as we photographed him and recorded his growth. Occasionally the old one would fly to the nest with a writhing garter snake grasped in her talons, and again she would alight with a field mouse held in her strong beak. The adult would no longer pose for her picture, as the camera whirred within a few feet of her; she would come in, stand for a moment, and then take wing. We took pictures of Willie until he was four weeks old, and then we had to leave him to his parents' care.

The woods were now a mass of green and the shrubs and fields were luxurious growths. Soon Willie would be able to shift for himself; and we left him with the hope that he would be able to find a mate and help populate and beautify some stretch of northern woodland.

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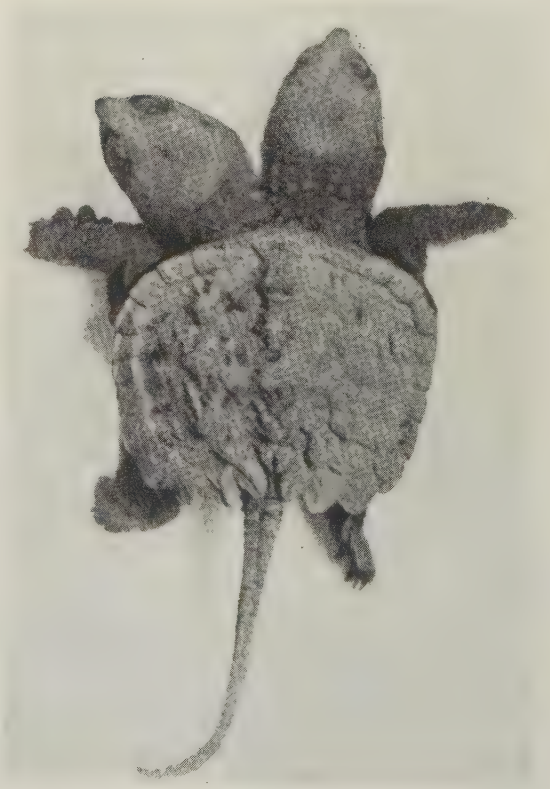
# NIP AND TUCK

BY S. M. CEDERSTROM

Now the animal life of Minnesota can rank with the many-headed dragons in China and the three-headed Hydras in Crete. Our unsung monstrosity is a two-headed turtle. It was found in the fall on the shore of Lake Minnetonka and was given to the Zoology Department, University of Minnesota. The turtle is an ordinary hard-shell snapping turtle of the species *Chelydra serpentina.* It was at that time about the size of a fifty cent piece and save for the possession of two well-formed heads was similar to all other turtles of its size and kind. X-ray pictures taken of this turtle reveal that each neck has the usual number of vertebrae and that each lateral half of the animal has an independent digestive tract which joins the other near the posterior of the body.



IS IT AN "IT" OR A "THEY"?
This turtle has two heads, two necks, two sets of eyes and two digestive tracts. One might say that it is singularly plural

Considerable difficulty was experienced at first in getting it (or them) to eat, so they (or it) were "farmed out" to the Museum of Natural History in the Minneapolis Public Library. The curator, Mrs. Grace Wiley, was raising several other turtles at the time, and with these companions "Nip and Tuck" (the newly christened two-headed little snapper) soon learned to take food. It feeds through either mouth, either alternately or, at times, coordinately. It appears as if the movements of each side of the body are regulated or controlled by the brain on that side of the body. This is especially evident when each head spies food and strives to get it at the same time.

This turtle has been kept in captivity for nearly a year and bids fair to grow up, since it is active, eats well and is steadily gaining in size and weight. The specimen is the property of the University of Minnesota but is kept most of the time in the Museum of Natural History in the Public Library where it has been seen and marvelled at by thousands of visitors.

# GARDEN POOLS

## WHETHER FORMAL OR NATURALISTIC, THEY ADD UNEQUALLED CHARM

BY ROMAINE B. WARE

A LITTLE girl I knew used to say she always imagined that fairies lived among the waterlilies in her garden pool. And surely such a place would be an ideal home for the "wee sma' folk" of legend and tradition, did they exist. Even such matter-of-fact folk as we humans find ourselves irresistibly drawn to the pools that are the bright jewels of our gardens.

A bit of sparkling water adds a degree of charm obtainable in no other way. From tiny puddles containing only a half barrel or so of water up to elaborate marble or tile-lined bowls with fountains and statuary, the medium is the same. Water, with its ever interesting surface reflections, its play of light and shadow, quickly becomes the center of attraction.

Gardeners in all sections of the country are fast finding the values in pools, waterfalls and rocks arranged and planted in a naturalistic manner. And popular opinion to the contrary notwithstanding, a pool is within the reach of practically any purse. The size has little to do with the attractiveness. I have seen tiny basins with less than two square yards of water surface which were far more charming than other pools many times as large. Charm is largely a matter of the skill with which the garden maker handles his subject.

The method of introducing a water feature into one's garden will vary greatly, as there are so many possibilities of arrangement and planting. Pools both formal and informal, streams, fountains, cascades or combinations of different effects afford a wide variety of treatments. Simple pools are the most common. The type you choose is largely a matter of taste. Formal types are more in keeping with formal architecture and gardening. Informal or naturalistic ones are more suitable to rock gardens and the informal hardy borders so popular today. Fountains are out of place in any but extremely formal settings. Cascades and waterfalls belong to informal treatments. They are excellent when well done but demand skill and understanding.

If your garden aspirations include a pool and waterlilies there are many factors to be considered. The simplest form possible is a rectangular or square pool with cement coping. It is not the most attractive from some viewpoints but when placed in the open lawn or upon a terrace adjacent to the house, is usually to be preferred. To fit the naturalistic pool into such locations

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CASCADES FROM A ROCKY HILLSIDE FEED THE POOL

All the charm of a mountain brook and lake has been brought to this garden, which stands on what was once level ground

is frequently difficult. Formal pools may be made quite elaborate by the use of marble, tile, cut stone or brick coping. If close to the house, they must be architecturally correct. They also demand clear sparkling water while that in many natural ponds is somewhat discolored from vegetation.

A formal pool may be of almost any size and depth, but if it is to contain waterlilies the depth should be limited to a foot or two. Lilies need about a foot of water above their soil surface. The shallow types have two additional advantages. The water within them warms up more quickly, which is favorable to both lilies and goldfish, and the darting fish are more readily seen. An excellent method of construction calls for a depth of one foot with round or square wells a foot deeper to hold boxes containing lilies. A formal pool may be made with its water surface at a level either above or below the surrounding soil, but the informal varieties must always be made in the lowest spot, as in Nature water seeks the lowest level. We must follow Nature.

WHERE THE FAIRIES LIVE

Waterlilies on the mirrored surface will make your pool the most beautiful spot in the garden, and the most satisfying

Full sunlight is desirable if lilies are to bloom properly. They will grow in partial shade but bloom only sparsely. For formality, the location should generally be upon the principal axis of the garden and demands no particular background, but an informal treatment does not demand such care, and is more effective with a background.

In the average back yard garden, an informal, naturalistic pool seems to be most popular today. To build and plant such a pool calls for an understanding of Nature that is obtainable only from actual study in the great out-doors. The more you observe Nature's way of planting around lakes and ponds and her schemes of rock formation, the better you will be able to build, plant and arrange. Constant study of the subject pays dividends.

Let us count the cost of pool building. Sand, gravel, and cement are the necessary ingredients for the pool proper, and at present prices enough for a pool ten by fifteen and two feet deep should be no more than twenty-five dollars. Many practical gardeners will be able to do the actual labor themselves with the aid of one man, hired on a day basis. Excavating for the pool is a simple task and most practical gardeners are quite familiar with the mixing of concrete. The gardener planning to build a pool will do well to obtain a copy of the recent book, *Garden Pools, Large and Small,* by L. W. Ramsey and C. H. Lawrence, Macmillan, 1931, published at $2.50.

Pools must have sub-drainage, to prevent heaving by frost; the concrete must be properly reinforced and requires waterproofing to make a good job. None of these things are difficult but they cannot be neglected.

When the cement work is complete the next task is margin planting, and here skill in use of materials can make or mar your pool. Much of its success will depend upon how natural it looks. The Nature student who has carefully observed streams, ponds and rock formations in the wilds will here find good use for his knowledge. The more skillfully you blend the pool with its location and surroundings the better your job will appear. Margin plantings, rocks or soil should completely conceal the edge of the concrete. The rocks must be placed naturally; do not stand a great many stone slabs upon edge around the pool; lay them in strata as Nature places them. Boulders are more difficult to place, as the tendency is to expose too much of them to view. Rocks around a pool should never be placed for display; rather they should nestle in among the plants and project only a little from the soil.

Among the many charms of a garden pool not the least are the aquatic plants, such as waterlilies. The graceful cat-tail, water hyacinth, umbrella plant and others may be used even in a small pool, though care must be exercised to avoid spoiling the play of light and shadow upon the surface of the water, which is one of the chief features of the pool. Most of the aquatics, however, are easily kept within bounds simply by cutting off or pulling out a portion of their foliage or in some cases cutting away a part of the root mass. With waterlilies this is important as they grow vigorously and the leaves crowd upon each other.

Many low-growing perennials and rock plants are admirable under such conditions. What you plant is largely a matter of taste and the effect will depend upon

how naturally you blend your materials and how carefully you select the species. For example, flowers such as calendulas, asters or petunias would be quite out of place, whereas forget-me-nots, arabis, or similar things will fit in nicely. At some points along the margin, the lawn may extend to the water's edge. At others, there may be a bank of rocks and at still other points a miniature gravel beach. All these features are natural.

There are, of course, some things you should avoid in planning and building. Bridges are frequently seen over small pools and they are obviously out of place. Miniature lighthouses are in the same offending class and so are the so-called "garden ornaments", such as gnomes, elves, giant toad-stools, rabbits and similar abominations. They are about as desirable in present day gardens as would be the cast iron deer of our grandparents' time. Avoid the use of fancy stones, that is, stones of curious, gaudy, unnatural appearance. The rocks are not to be placed as curiosities but as parts of a natural setting.

Running water, in the form of streams, waterfalls or cascades, has a peculiar appeal to the garden lover who truly appreciates Nature. Where it dashes over a naturally-appearing rock formation, it seems to be the ultimate in informal water garden construction. Such schemes in the past, however, have met almost insurmountable difficulties. Installations have been very costly where properly done, and cheap, make-shift schemes have proved troublesome from start to finish. But where one has the advantage of a practically unlimited water supply, such effects are comparatively simple of attainment.

To the uninitiated the first thought of stream-building would be a simple pump. Investigation, however, will teach that many factors must be considered when selecting and installing such a device. Pumps, even the best centrifugal varieties—and they have generally been recommended—are pieces of machinery with all the frailties and crankinesses heir to that type of invention. Their moving parts revolve upon metal bearings and these must receive regular lubrication. The water passing through such a pump must be kept free from dirt and other foreign matter by the use of screens or the pump will soon wear out. Many types of pumps are available, but with only one exception, all of them face the above difficulties. Amateur gardeners with mechanical inclinations have installed pumps from motor cars and, without exception, have experienced trouble.

There is one pump developed in the past few years primarily for garden installation, however, that seems to be absolutely fool-proof. It operates by compressed air upon what is known as the altered gravity system. The principle of the pump is extremely simple. It has no moving parts, no valves or screens, requires no lubrication; in fact, it is so simple in construction that one may operate it day after day for years with merely a weekly oiling of the tiny quarter horsepower motor and small compressor conveniently located in basement or garage. A couple of dollars a month for current and a few quarts of oil comprise the entire cost. It will raise twenty to thirty gallons of water per minute to a height of five feet or more, making possible water effects without exorbitant outlays.

In the western city where this pump was developed and introduced I saw many delightful installations. Some were tiny rivulets meandering down a slope. Others were miniature waterfalls with a sheer drop of several feet while still others were clever reproductions of natural cascades, with water bounding and tumbling as in a mountain stream. Ferns, mosses and wild flowers as well as carefully selected garden and rock plants make such creations delightfully naturalistic.

A SMALL POOL WILL DO

At little expense one can, by careful planning and study of Nature, reproduce such loveliness in one's own home grounds

Some owners of lily pools are bothered by the formation of a green scum upon the water, usually especially troublesome in hot sunny weather. It is caused by algae, which may be eliminated by dissolving copper sulphate (blue vitriol) in the water. In pools containing no fish this may be used in the proportion of one ounce to about eight thousand gallons of water. The solution should be only one-third as strong when fish are present. Running water is not as likely to be infested by algae.

The growing of vegetation in one's pool is apt to discolor the water. This is perfectly natural and should not be considered objectionable. Some gardeners, however, demand clear sparkling water and this may be maintained through a portion of the pool by building a wall

THE FORMAL POOL AT ITS BEST
It lies on the principal axis of the garden, and lends dignity and grace

to within about two inches of the water surface and thus separating the area with growing plants in it from the rest of the pool. Such a wall is also desirable in a pool where one attempts to combine growing plants with running water. Most plants like warm water and circulating water not only is inclined to be cool but its motion twists the plants, especially waterlilies, all out of place and it is seldom they grow successfully in moving water. By walling them off this difficulty is obviated.

To plan your garden pool well in advance of the construction is very important. Study your garden possibilities. Plan informal effects, for they are by far the most interesting; location and grading are also vital. I have in mind as an example of good work a pool built last summer where the owner graded the area by moving soil in a wheelbarrow. In order to secure a natural effect the pool was depressed three feet below the original ground level. On one side the surface was graded back with an easy slope for thirty feet and back of the pool all the soil from the excavation was used to produce a hill about six feet high with its face developed as a rock garden and the summit planted with tall shrubs and evergreens to give height and make a background. The finished effect was perfectly natural and the pool looked as if it "belonged there." This is the kind of effect we should all strive for and it is perfectly possible if we study the problem sufficiently.

A ROCK GARDEN SPRING
Just the touch to give validity and naturalness to the boulders

Among the plants whose beauty and variety make them ideal for planting about the garden pool are our native ferns. As a class they are adaptable to all degrees of soil and moisture. For the higher parts of the surroundings there are rock ferns, some of which are tolerant of considerable aridity, while other species grow best with much moisture about their roots. One great advantage of ferns is that they live for many years with a minimum of attention. Good gardens don't "just happen." They are the result of carefully worked out plans.

# BLOODSTONE AND AQUAMARINE

## BIRTHSTONES FOR THE CHILDREN OF MARCH

BY AUGUST POHNDORF, JR.

JEWELS OF AQUAMARINE

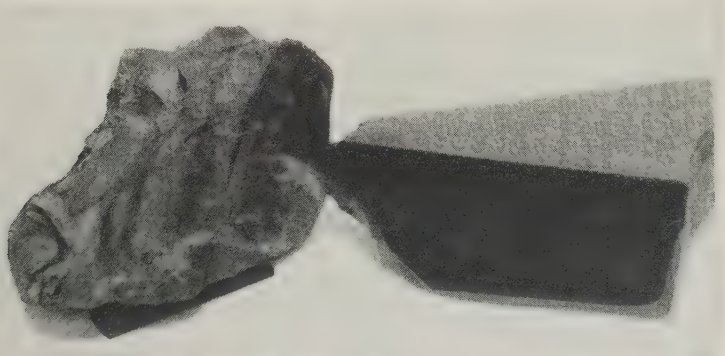
Wearers of this stone are assured happiness and victory by the old mythologies

**This article constitutes the third in the series on birthstones prepared especially for Nature Magazine by Mr. Pohndorf, who has made a lifetime study of precious stones, and deals with the two gems dedicated to those born in March—the bloodstone and the aquamarine**

To the children born amid the blustery winds of March belong the healing bloodstone and the gracious, heaven-reflecting stone called aquamarine.

Bloodstone is green chalcedony so spotted with red that it appears to be flecked with bright blood. Its name is derived from its sanguinary appearance, which likewise has given rise to a beautiful legend concerning its origin. When Christ was crucified upon Calvary's heights, bright drops of His precious blood fell upon a green stone at the foot of the Cross and left their stain wherever they fell; and to this day, tradition tells, all manner of bloodstones bear the drops of the Master's blood.

In ancient times this birthstone was called heliotrope (sun-loving) because, as Pliny wrote: "if placed in a vessel of water and exposed to the full light of the sun, it changes to a reflected color like that of blood. Out of water, too, it reflects the figure of the sun like a mirror, and discovers eclipses of that luminary by showing the moon passing over its disk." An interesting legend, at least.



BLOODSTONE IS A FORM OF CHALCEDONY

It owes its name to its sanguinary appearance, and legend has it that it was born at the foot of the Cross

Like other gems, bloodstone possessed a host of magical properties, in the view of the ancients. If rubbed with the juice of the plant heliotrope, while certain incantations were being repeated, it rendered the wearer invisible. An early English medico calls it "The speciall stone to staunche blooding & good against poyson." To a lesser extent it was believed to bring safety and a long life to its possessor.

Bloodstone is silicon dioxide (quartz) stained green by peroxide of iron and permeated with spots of red jasper. It is a form of chalcedony, a waxy-looking, translucent or opaque variety of quartz, but it has the hardness of flint or jasper. The only acid solvent known is hydrofluoric acid, which is commonly used in the etching of glass, and the stone is infusible. It weighs a little more than two and a half times as much as water. When polished, it has a hard, waxy appearance.

The finest stones come from India, although fine gems are found in Australia, China, and Brazil.

One of the most famous bloodstones is "The Descent from the Cross", done by Matteo del Nassaro of Verona about 1525. It is in relief, with the natural red spots depicting the wounds of Christ and His dropped blood. This gem is supposed to have become the property of Isabella d'Este, Duchess of Mantua.

The alternative birthstone, aquamarine, is, at its best, a bit of sky taken from the heavens at dawn. No other gem can so perfectly reflect "the vault of blue" as this, and it is easy to understand why through the centuries it has symbolized happiness, everlasting youth and victory. It has all the freshness and inspiration of the perfect day that so thrilled the shop-girl Pippa in Browning's poem.

This stone is the pale blue and the greenish blue beryl, a silicate of aluminium and beryllium. It is of the same family as the emerald, morganite and the helidore, and takes its name—literally "the water of the sea"—from its color, which is probably due to the replacement of minute quantities of beryllium by the alkali metals, sodium, potassium, calcium, and lithium, and of aluminium by iron and chromium oxides. It occurs in six-sided prisms of greater length than thickness which are generally furrowed along the longitudinal axis, and may be as clear as crystal or as opaque as stone. It is slightly harder than the emerald, and about as brilliant.

Historians have recorded that light-colored aquamarines and other light greenish beryls were used over two thousand years ago for spectacle lenses. Nero used to view the games through such glasses, for, like the rest of the world, he believed that beryls of this color were beneficial to the eyes. We still prefer green for eye-shades.

Some of the finest aquamarine crystals have been found in the Urals and Siberia. Madagascar, France, Bavaria, Brazil and the states of Maine, North Carolina and Colorado add to the world's supply. Most of the stones are not very large, and the enormous ones are usually of gross texture and of little value, although a Brazilian crystal, weighing two hundred and forty-three pounds, sold uncut for $25,000. New Hampshire supplies many hexagonal crystals weighing several hundred pounds each, but their value is small.

Lucky is the person born under the sign of Aries, lucky at least in the choice of birthstones! Whether he select the green beauty flecked with bright red that is the bloodstone, or prefers the sky-blue perfection of the aquamarine, he is wearing a stone famous through the ages, with tradition, legend, and history woven around it.

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# NATURE AS A WOOD-CARVER

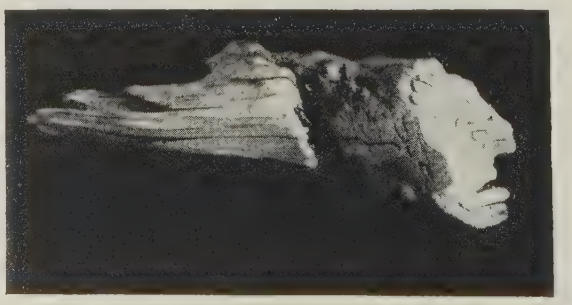
BY ARTHUR K. WRIGHT

PHOTOGRAPHS BY FREDERICK ELLERMAN

GENTRY OF WOOD

Introducing the men of the manzanita root, as carved by Nature's chisel, the weather

THROUGH the ages tellers of tales have left us legends of certain mythical characters whose spirits have been imprisoned in the bark-clad forms of trees.



Artists of varying degrees of imagination and skill have attempted to picture these for us, but few have achieved anything of more striking appeal than the bit of work dashed off by Nature in one of her whimsical moods on a broken fragment of manzanita root about four inches in length and a couple of inches across. The root was picked up along the trail on the top of Mount Wilson.

When the piece is held upright by the slender end, we see a striking likeness to one of those fairy creatures whom the ancients liked to imagine as sporting with agile-limbed nymphs in woodland places.

Turning it to a horizontal position we see an entirely different sort of person; this time such a one as might have been the leading spirit in some old Indian legend, whose action took place in the very mountains where the object was found.

Views of both faces show the piece exactly as it was discovered, untouched by anything but the hand of time.

# ELEPHANTS OF THE SEA

## THEY ARE "AT HOME" TO VISITORS OF GUADALUPE ISLAND

BY LEWIS W. WALKER

PHOTOGRAPHS BY THE AUTHOR

A ROARING BULL OF GUADALUPE

The seemingly useless trunk seems to act as a sounding board when the animal lifts its voice

UNTIL a few weeks ago, the famous elephant seals of Guadalupe Island seemed entirely out of reach, as far as I was concerned. Five times I had started for the Island, but on each occasion something came up to change the destination of the boat. So when I recently boarded the *Velero III* with a party of San Diego scientists, and the Diesel-powered craft headed toward Guadalupe, I was hopeful, yet skeptical. And I remained in doubt until, at last, we rounded a rocky point, and came in sight of a secluded narrow beach, backed by precipitous walls of lava, two thousand feet high. Guadalupe at last! As we came in we could see with the naked eye gray forms just above the water mark—forms that looked more like rocks than mammals. Glasses, however, proved them to be elephant seals—the largest of the true seals, and, with the exception of the Guadalupe fur seals, probably the rarest members of their family.

Making a landing had its thrilling moments, although we were fortunate in encountering a fairly calm surf. When we were fifty feet from the beach a massive object loomed up in the water before us. It was too late to stop when we spied it, for a wave was pushing us on. A lazy tail rose above the water on the port side of the dory, while a heavy head, adorned with a bulky proboscis, stirred the water on the starboard. Cameras were raised high in the air, for a spill was expected, but the half-submerged bull did not seem to mind having his back scratched as we slid over. In a few seconds the water became shallow enough to permit us to leap and run for dry land—land which was covered to a great extent by huge marine mammals. These monster seals, which occasionally reach twenty feet in length and weigh almost four tons, seemed to have no fear at all of humans. Raised heads and muffled grunts were their only protests as we passed freely in and out among them.

The elephant seal, which is slowly making a comeback from the very verge of extinction, has several very peculiar characteristics. The name "Elephant of the Sea" is gained from the trunk-like, elongated proboscis of the males. As far as is known, this organ has no use in connection with the animal's livelihood. The roaring bulls often allow it to drop inside their mouths, where it becomes inflated and appears to act as a resonator. As the nose on the cow elephant seal tends more toward the "normal", it is believed that the lengthened appendage has nothing to do with the catching of food.

THEY PAID NO ATTENTION TO MEN

The bulls allowed the visitors to walk close to them without showing either fear or anger. Some think that the bulls' proboscis is inflated by the breath

All of the comparatively few scientists who have visited this elephant seal beach have been struck by the almost total absence of females and young; yet the herd is increasing. Fifteen years ago there were but eighty animals; this spring the herd was estimated to number fifteen hundred animals.

The comparative absence of females is to be explained by the fact that all such animals necessarily are obliged to absent themselves from their young while feeding, and their fishing grounds may be many miles distant from the breeding island. Although the breeding habits of these great seals have not been studied in detail, it is evident that Guadalupe is the permanent home of the herd—the spot where the males congregate and rest at intervals throughout the year, where the females come at their appointed time to meet their mates and to give birth to their young, and where the young black pups await the periodic visits of their mothers laden with milk.

NO GREAT BEAUTY SEEN HERE

Perhaps it is no wonder that the females spent their time at sea. The elongated nose adds to their grotesqueness

Originally, the northern elephant seals were found on Cedros, or Cerros, Island, the San Bonito Islands, and in some instances on the mainland coast of lower California. Whalers, however, found that a good quality of oil could be obtained from the carcass, and the slaughter stopped only when the mammals became so scarce that it no longer paid to pursue them. On several occasions it was thought that they had been completely exterminated, but always stragglers existed to rebuild the herd.

To date very few animals have been taken with food in their stomachs. One that was harpooned off Port Loma by a fisherman was examined. It contained the remains of about thirty kelp sharks, a rock bass, and a double handful of squid beaks.

The future of these animals now seems fairly secure. One great danger is the high wall of lava that backs their beach, a hazard man cannot control. The strip of sand on which these animals are found is several hundred yards in length, by about a hundred and fifty feet in width. At each end there are great masses of crumbled rocks which tumbled destructively down at some time in the past. If such a landslide should again occur when the bulls are at home, it is doubtful if any would escape.

As far as danger from man is concerned, they are now well protected, due to the organized efforts of zoos and museums. Several years ago, at the request of American organizations, President Obregon of Mexico made Guadalupe Island a Mexican preserve. Stern penalties have been fixed for landing without a permit. Only one more bit of protection is needed, and that is an international agreement that will guard them on the high seas. The North Pacific Fur Seal Treaty has been marked with such wonderful success that the same measures should be followed in the case of this unique animal, whose habits are as yet little known, and deserve much study.

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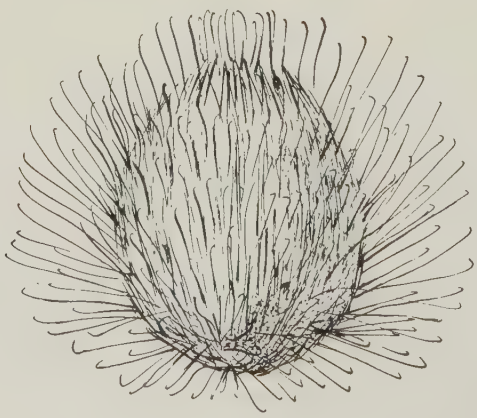
# BURS OF COMMON PLANTS

## NO. 3—THE BURDOCK

BY SALOME C. MILLER



THE bur of burdock is composed of an entire blossom head, containing the seeds of a large number of tiny one-seeded flowers. The little, modified leaves, which grow immediately beneath the blossom head and are usually known as bracts, have sharp points which curve into hooks and become stiff upon drying out. These are very effective in catching into clothing or fur or hair, there to remain while the seeds are shaken out, one or two at a time. Burdock is a well-known weed, and is easily recognized by its huge leaves which resemble those of rhubarb, and by its large masses of not unattractive purple flowers. Many are the burs of burdock outdoors youngsters have carried to new fields in their roamings.

THEIR MEMORIAL GROVE HONORS WASHINGTON
Santa Cruz Lodge No. 38 F. & A. M. directed by R. E. Burton, "tree crank", plants 600 trees in California in honor of a Master Mason

# BI-CENTENNIAL TREE PLANTING CIRCLES GLOBE

BY RUSSELL T. EDWARDS

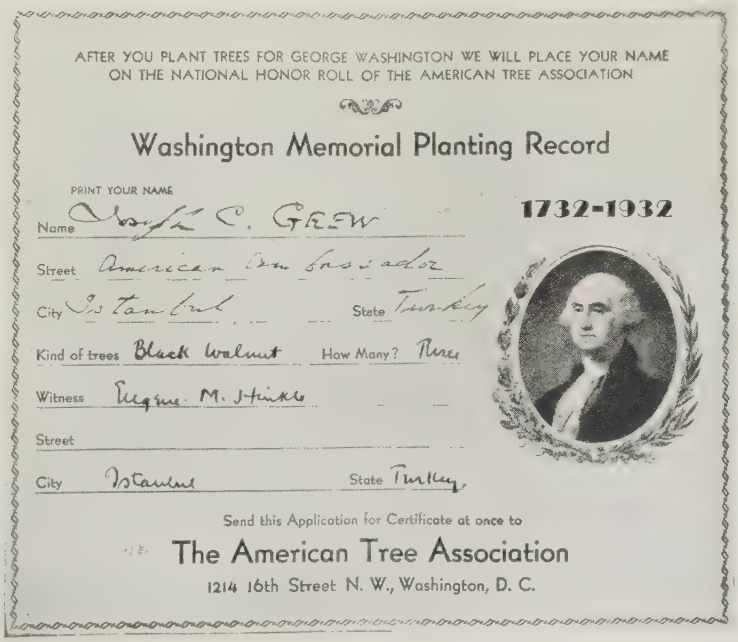
THE CALL of the American Tree Association to plant trees in memory of George Washington to mark the bi-centennial in 1932 of the birth of the first president has gone around the world. Twelve radio stations have broadcast the plan. WJDX at Jackson, Mississippi, planted a tree by radio; Mrs. G. H. Reeves of the Mississippi Federation of Women's Clubs and Fred B. Merrill, the state forester, with Wiley P. Harris, director of the station, planned the program. The tree was in a tub and as names of those in the station were called in the microphone each one placed a trowel of earth on the roots. The tree was then placed in the grounds of the building. Mrs. Paul N. Geiger, conservation chairman for Ohio, broadcasts from Cleveland. WOR has repeatedly sent out the bi-centennial tree planting talks by "Bamby, The Tree Lady," who calls upon tree planters to register.

Joseph C. Grew, the American Ambassador at Istanbul, Turkey, was the first representative of the American government in the foreign land to register. His application is pictured here.

King Boris III of Bulgaria marked the bi-centennial by presenting to Henry W. Shoemaker, the American Minister at Sofia, two rare Balkan varieties of evergreens, one for the Legation, the other for the American School near Sofia. These trees have been planted by Minister Shoemaker with Mr. I. Kerekoff of the Bulgarian foreign office representing that nation. Mrs. Shoemaker, Mrs. Maynard Barnes, Mrs. Frank Barnes, wives of the secretaries of the Legation, and Mr. H. Frey, the King's landscape gardener, helped in the planting.

Following this has come the registration of Fred Morris Dearing, American Ambassador at Lima, Peru, who, with Garrett G. Ackerson, Jr., as a witness, has planted a tree at the County Club at Lima. Another registration has just been received from F. E. Libenow, the Consular Agent at Charnaral, Chile, and one from the American Embassy in Rome.

From Cuba has come the registration of Eugene E. Jova, the American Consular Agent at Sagua La Grande. Pompillio Montero, the Director of the Board of Sagua Yacht Club and Secretary of the Rotary Club of Sagua La Grande, has also registered on the national honor roll. There has been more than a hundred registrations from the Boy Scouts in Hawaii.



AFTER YOU PLANT TREES FOR GEORGE WASHINGTON WE WILL PLACE YOUR NAME ON THE NATIONAL HONOR ROLL OF THE AMERICAN TREE ASSOCIATION

**Washington Memorial Planting Record**

PRINT YOUR NAME

Name Joseph C. Grew

1732-1932

Street American Ambassador

City Istanbul State Turkey

Kind of trees Black Walnut How Many? Three

Witness Eugene M. Hinkle

Street

City Istanbul State Turkey

Send this Application for Certificate at once to

**The American Tree Association**

1214 16th Street N. W., Washington, D. C.

With the registration of more than twelve million tree plantings new impetus has been given the project by the organization of juniors into George Washington Chapters of the Garden

MRS. B. F. WILLISTON, MICHIGAN FEDERATION, GETS FIRST 40-ACRE UNIT OF SEVEN-YEAR PROGRAM UNDER WAY IN OGEMAN FOREST RESERVE

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AT AKRON, O., MEMBERS OF BUCKLEY POST NO. 12, G. A. R., PLANT FOR WASHINGTON. (PHOTO TIMES-PRESS)

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A ONE-TIME MARINE, SMEDLEY D. BUTLER, (BELOW) SHOWS THE STATE FORESTERS HOW TO "DIG IN" WHEN THEY PLANT A TREE ON THE CAMPUS OF THE UNIVERSITY OF FLORIDA

Clubs. In addition, the General Federation of Women's Clubs has gone into the junior idea also in connection with the thousands of registrations its clubs are making. Mrs. Margaret L. McMechen is the garden club chairman who promises new thousands of tree planting citizens in outlining the project to Mrs. John F. Sippel, the president, and Mrs. John D. Sherman, in charge of women's activities for the Bi-centennial Commission.

IN THE GARDEN OF THE LEGATION AT SOFIA, HENRY W. SHOEMAKER, AMERICAN MINISTER, WITH PICKAX, PLANTS A TREE FROM KING BORIS III OF BULGARIA. M. KEREKOFF OF FOREIGN OFFICE IS ON THE RIGHT. MRS. MAYNARD BARNES HOLDS THE TREE

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NATIONAL SOCIETY OF THE COLONIAL DAMES OF AMERICA, WITH MRS. JOHN EWING PRICE PRESIDING, PLACE THE STATE'S TREE IN VOLUNTEER PARK, SEATTLE. GOV. R. H. HARTLEY AND REAR ADMIRAL W. T. CULVERIUS SPOKE

# SERVANTS OF THE SEA

BY BEN HUR LAMPMAN

THAT vast and estimable dame we know as the ocean has a determined antipathy for all untidiness. So varied and prolific is the life she nurtures that death and dissolution are forever in her tides. Yonder a sea-bird stricken far offshore, and there a great fish, monstrous and unreal, and everywhere the rubbish of her gardens, the streaming kelp, the lacy weed that is so like the flounce of a Victorian gown. Her shell-fish perish in their seasons, and there are constantly recurrent fatalities among the crustaceans. The vari-colored jellyfishes come to an end of days, and rent and torn by the tides are carried shoreward, while continually there is borne to the beach a great burden of minute marine forms, the algae, and indeed all plankton—that thin but nourishing soup-stock of the sea. In a single week of summer the beaches receive so much of outworn life that only for the wise provisions of Nature they would reek of death. But the sea, through her attendants, is intolerant of foulness and decay, and works interminably to keep her house in order.

It suffices to name but three of her principal servants, whose duty it is to police the beach, and to free the air from pollution, so that the sands are commonly as clean as a swept hearth, and the breeze untainted. These three are the hovering gulls, with an eye keen for any flotsam, the anchorite sea-anemones, and those ubiquitous and agile crustaceans that are called sand-fleas or sand-hoppers. Of these three widely varying forms of life, these servants of the sea, possibly the most important service is that rendered by the omnivorous sand-hopper, whose nimble antics appear so purposeless and frantic. For the anemone must bide where it is stationed, patient as time, and the gull is rather a finical fellow, exercising a somewhat narrow choice of foods, but the sand-hopper is legion and everywhere, and its crustacean appetite asks no question of the fare that is spread. It gleans where the gull has feasted, it penetrates the mollusks that defy the bird, and its salad is kelp and weed.

To the sea-anemone in its pool, whence current and tide cast both dead and living food, all that comes within reach of its tentacles is destined for its capacious stomach. In rose or emerald it blossoms as a flower, but its purpose is to satisfy hunger, and its loveliness screens avidity. Thus it combs the fringes of ocean for aught the tide may bring, and does important service toward the cleanliness of the sea. To the questing gull all meat is food, and

since much of the sea's wastage is beyond the capacity of those other creatures that feed at the brink of the sea, and too huge of bulk for immediate demolition by the minor crustaceans, it follows that a deal of tidying is left to the midget sand-hopper. The weed that drifts ashore this tide will be reduced to fibers. The shell will be purged of its content. The bones of the fish will be cleaned, and the crab's claw hollowed. It is true that the various creatures beneath and above the tides all serve to preserve the wholesomeness of mother ocean's beaches, yet at long and at last it is the sand-hopper that best serves the purpose.

Appetite on the beaches knows no bounds. It is reported by one observer that a sea-anemone, having swallowed a shell-fish, was all but cleft by the distention. The position of the shell in the creature's stomach separated that organ in halves, the lesser of these being effectively blockaded from the mouth. Did the anemone pine and wither, and yield up its curious ghost because of this mishap? Not so. The instinctively resourceful creature proved a master of stratagem, and for that portion of the stomach which was blockaded it grew another mouth. And there it clung to its rock, gratifying not one hunger but two, and no doubt well pleased with itself. It had altered a misfortune to a benefaction, and in a general way it may be said that this is a secret men yet are seeking. Of the function of the sand-hopper, in cleansing the beaches, an old work on the sea's creatures observes:

'The sand-hoppers are extremely frequent on the shores of the arctic seas, where they emulate the tropical ants in their speedy removal of decaying substances. Thus Captain Holboll relates that, having inclosed a piece of shark's flesh in a basket, and let it down to a depth of 75 fathoms, in the Greenland sea, he by this means caught within two hours six quarts of these little creatures, while a vast number still followed the basket as it was hauled up."

So numberless are the sand-hoppers, than which no living creature is more erratic, that we tread them down without thought, as casually as we tread upon the sand. Indeed, there is no choice. But should they vanish tomorrow, should the sea that spawned them briefly decree their extinction, our lack were sad enough. Far from the beaches, in the sweltering summer weather, we would talk of the golden days when there were lots—yes, lots—of sand-hoppers—the gift of a wise and a truly tidy Nature.

# PLANTS THAT IMPROVE ON ACQUAINTANCE

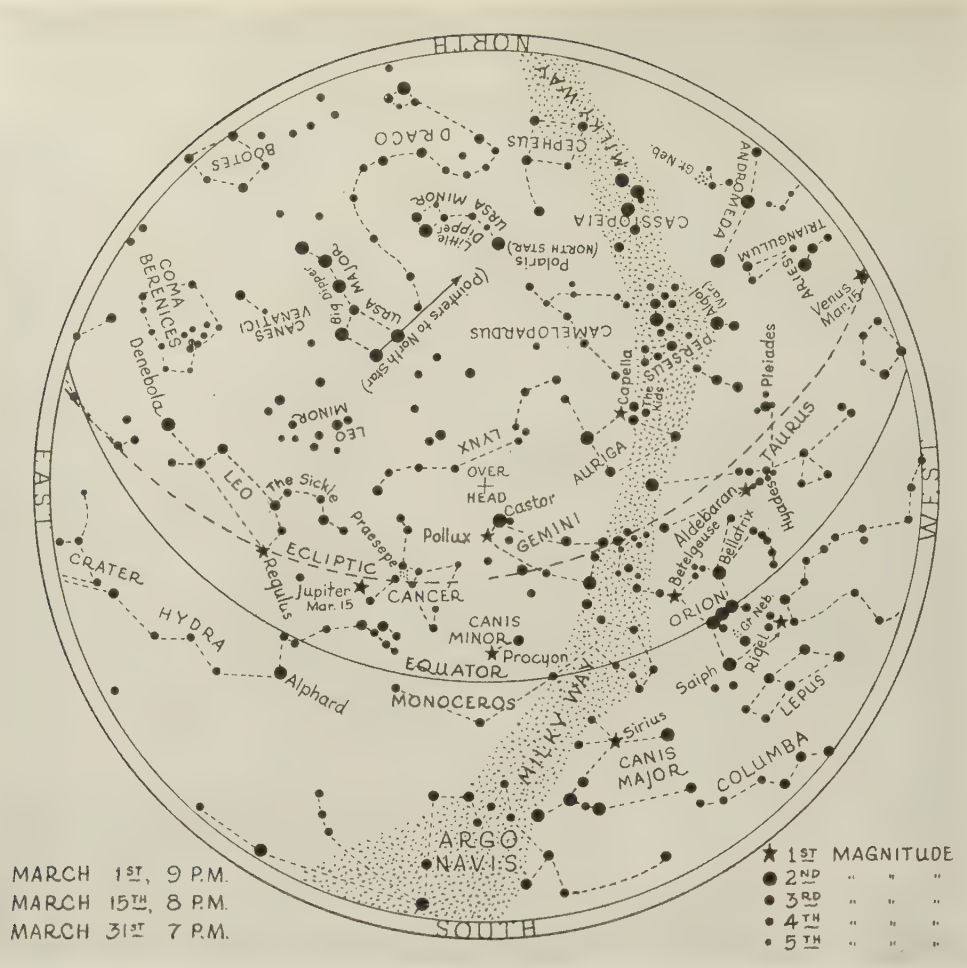
BY FREDERICK KELSEY

THERE are many exotic plants perfectly familiar to readers which upon personal inspection reveal features entirely novel and surprising. During a recent visit to Hawaii I was amazed at the beauty of the coconut palm in bloom. The flower branches were eighteen inches in length and were so dainty and delicate as to appear like exquisite lace-work thrown over the tree. Held at the tip of each spray of pink flowers were tiny milk-white coconuts—each the size of a small cherry. On one spray I counted twenty-three such nuts.

Another plant that no amount of description can properly portray is the silk cotton tree. This curious variety of *Ceiba,* a wide-spread tropical genus, has projecting from its trunk grotesque flanges ten to fourteen feet high. This unusual root-growth is tall and thin and slopes gradually to the ground, many feet away from the trunk. There are two very fine examples of this tree in Nassau. One which is in front of the Court House is said to be two hundred years old.

The beauty of a rare plant found on the Island of Maui, Hawaiian group, likewise impressed me deeply. It grows in scanty soil on the side of a burnt-out crater about ten thousand feet above sea level. This, the silver sword or *Argyroxiphium macrocephalum,* sends up from its compact mass of gleaming leaves a flower spike similar to that of the yucca. It is found nowhere else than on the Island of Maui—and even here has been allowed to survive in small numbers only on one side of the crater.

THE SILVER SWORD PLANT OF HALEAKALA CRATER
It blooms in the crater of this ancient volcano on the Island of Maui in the Hawaiian group




To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

# MARCH AND ITS STELLAR PERFORMERS

## MERCURY AND THE ZODIACAL LIGHT PLAY TITLE ROLES THIS MONTH

BY ISABEL M. LEWIS

THE SPRINGTIME, during which the ecliptic rises most sharply from the horizon, is the best period of the year for searching out the planet Mercury and also for seeing the Zodiacal Light, that faint nebulous glow which is about equal to the Milky Way in brightness and which stretches upward from the horizon at the point where the sun has set.

This spectacle appears in the form of a cone or wedge with its base on the horizon and its blunt apex along the ecliptic at a distance above the horizon which varies with atmospheric conditions and visibility. Only when the air is very clear may one view this interesting phenomenon.

In the tropics, particularly at sea, the Zodiacal Light is conspicuous and beautiful on many nights and often extends as a luminous band from the western to the eastern horizon along the ecliptic; but in the temperate zones it assumes a triangular appearance, and is quite faint and hazy.

The Zodiacal Light is caused by the reflection of sunlight from fine particles of cosmic dust or gas molecules that surround the sun within the orbit of the earth. An attendant phenomenon far more difficult to observe is the Gegenschein, or Counterglow, which is the reflection of sunlight from a condensation of such particles at a distance of about a million miles beyond the earth and directly opposite to the sun. Here, under the combined attraction of sun and moon, the particles are drawn into a whirlpool of motion and the result is a faint, luminous patch about ten degrees in diameter. Very few have ever seen the Gegenschein, as it can be observed only on nights of exceptionally fine visibility.

Mercury is the least observed of the five bright planets and one always experiences a thrill of pleasure when he succeeds in finding this brilliant little planet. It always seems to be playing hide and seek with us in the evening twilight and never wanders farther than twenty-eight degrees from the sun. Record of observations of Mercury date back as far as 264 B.C., but at first it was not recognized as the same planet when seen on opposite sides of the sun. It was called Apollo when visible in the eastern sky before sunrise and Mercury when visible in the west after sunset.

Mercury is exceptional among the planets in many ways. It is the smallest of all of them, being a little more than three thousand miles in diameter. Jupiter and Saturn both have moons equal to or greater than Mercury in size. It is the nearest to the sun and the swiftest in its motion. Its year is only eighty-eight days long and its average distance from the sun about 36 million miles. Its orbit is the most flattened of all the planetary orbits and is inclined at the highest angle to the ecliptic.

This planet is a world without an atmosphere, and it is practically certain that it always keeps the same face toward the sun. One side, therefore, is scorched perpetually by a heat intense enough to melt lead while the opposite side, on which the sun never shines, is doomed to frigid blackness in which the temperature must be nearly at the absolute zero of space. Its density is about equal to that of the moon and so is its reflecting power. It is probably a rocky, barren little world very much like our satellite.

So much for what we know about the brilliant little star-like object that you may be able to pick up in the evening twilight from about the sixteenth to the twenty-eighth of March, a little north of west and not far above the horizon. Only its sparkling brilliancy makes it visible when in the twilight and so near the sun. Mercury will reach its greatest eastern elongation, that is, its greatest distance east of the sun, on March 23 at almost exactly seven o'clock in the evening, eastern time. Its distance from the sun at that time will be just eighteen degrees and forty minutes. It will appear in the telescope as a beautiful little half moon, for, like the moon, Mercury and Venus exhibit phases, since their orbits lie between that of the earth and the sun. Before elongation it will be like the gibbous moon in appearance and a few days later will be noticeably crescent in shape. It is generally visible for about a week before and after the date of elongation. During this time it will change very considerably in brightness.

On the sixteenth it will be almost exactly equal in brilliancy to Canopus which is, next to Sirius, the brightest star in the sky. It will then steadily become dimmer. On the twenty-third it will be almost exactly of zero magnitude, that is, a little more splendid than such stars as Vega, Capella, and Arcturus. By the twenty-eighth, which is probably the last day of its visibility, it will shed just a little more light than the first magnitude stars, Aldebaran, Spica or Regulus. It will then grow less and less luminous as it draws in toward inferior conjunction with the sun early in April. Like that of the moon after the last quarter, its phase is a waning crescent which disappears entirely when it reaches the line of the earth and sun. Mercury was sometimes called by the ancients "the sparkling one" because it scintillated conspicuously. This characteristic is due to its position near the horizon and to the unequal refraction of its rays in passing through the layers of the earth's atmosphere at an oblique angle. This is typical not of Mercury alone but of all stars and planets when viewed close to the horizon.

In addition to Mercury, Venus and Jupiter may be seen in the evening sky this month. Venus is now increasing in brightness and at sunset on the fifteenth will be nearly midway between the western horizon and the meridian. Jupiter is in Cancer and about equally high above the eastern horizon at the same time. These two planets now surpass all other stellar objects in brightness. Venus is by far the brighter of the two but disappears below the western horizon about three hours after the sun.

Mars is now in the morning sky but too close to the sun to be seen while Saturn is low in the southeast at sunrise.

Spring begins this year on March 20 at 2:54 p.m., eastern time, when the sun crosses the equator coming north and day and night are equal in length all over the world.

There will also be two eclipses this month, one, on March 7, an annular eclipse of the sun that will be visible only in the south Pacific and Australia, and the other, on the 22nd, a partial eclipse of the moon visible in the Pacific and Indian Oceans and Australia and part of Asia. The beginning of this eclipse may be seen also in all parts of North America except the northeastern section. In the extreme northwestern part the entire phenomenon will be observable. This eclipse will be 97% total. In the eastern states the eclipse will begin nearly at the time of sunrise, with the moon at the western horizon, and so will not be seen generally.

The evening sky in March is remarkably beautiful and interesting to star-gazers. West of the meridian we now see a brilliant assemblage of first magnitude stars in the well-known winter constellations—Aldebaran in the Hyades of Taurus and not far away the Pleiades; Orion with its Rigel and Betelgeuze; Capella in Auriga; the Dog-stars, Sirius and Procyon, in Canis Major and Canis Minor; Castor and Pollux in Gemini, and sloping high across the eastern sky, from Argo Navis on the southern horizon, across the feet of Gemini, through Auriga, Cassiopeia and Cepheus to the northern horizon, the blended radiance of countless faint and far distant stars in the Milky Way. Strongly contrasted with the splendor of the western half of the sky is the milder radiance of the spring constellations of Hydra, Leo and Virgo. The latter constellation is still partly below the horizon as is a part of the long winding constellation of Hydra. Draco and the Big Dipper are now well in view in the northeast as Cassiopeia and Cepheus draw nearer.

# THINGS TO THINK ABOUT

## More on Waterfowl

Things move fast in the field of wild life conservation, real, false, and otherwise. In referring to rapidity of movement it will be perceived that we allude not at all to the actual *saving* of wild life, but to the flood of manifestations that are put out under the guise of its conservation.

In these pages have appeared, from time to time, announcement of certain measures that have been adopted by State and Federal agencies to restrict the killing of waterfowl, and of the various reactions of the killers to these laudatory efforts. The open season on these harassed birds is now ended for a time, but the season for wire-pulling never terminates. We believe that the following announcements will lead up to events of great interest, but we make no pretense of ability to foretell what shall be the final effect on the waterfowl.

In the annual report of the National Association of Audubon Societies, published in *Bird-Lore* for November-December, and issued early in January, 1932, Dr. Pearson, in the course of reviewing certain salutary measures for waterfowl protection, particularly the reduction of the open season to 30 days, in which, as a member of the Government Advisory Board, he had been interested, made the following significant announcement:

"Less than three weeks ago your president was called to Washington where it was found that political pressure had been brought to bear on President Hoover and Secretary Hyde to rescind this restrictive measure and substitute therefor a three-days' shooting period each week for ten weeks. By a large vote we of the Advisory Board disapproved of such a change, and a few days ago we received word from Washington that the Secretary was standing by the regulation."

We congratulate Dr. Pearson, in all sincerity, on the publication of this important announcement.

The act alluded to by Dr. Pearson represented his last service as a member of the Advisory Board, which, since 1913, has advised the Department of Agriculture regarding changes in the regulations that have been proposed concerning the protection of migratory birds. On January 13, Secretary Hyde announced to the press his plans for a reorganization of this body and the creation of a new one. The membership of the board now dissolved was as follows:

John B. Burnham, Essex, N. Y. (Chairman)

William C. Adams, chief, division of fish and game, department of conservation, Albany, N. Y.

Brooke Anderson, president, Chicago Camp Fire Club, 38 South Dearborn Street, Chicago, Ill.

Sam G. Anderson, Hutchinson, Minn.

Alva Clapp, State game warden, Pratt, Kan.

William E. Corey, 25 Broadway, New York City.

William L. Finley, Jennings Lodge, Ore.

George Bird Grinnell, president, Boone and Crockett Club, 238 East Fifteenth Street, New York City.

A PAGE DEVOTED TO CONSERVATION FROM VARYING ANGLES

• • •

E. Lee LeCompte, State game warden, 512 Munsey Building, Baltimore, Md.

Clark McAdams, St. Louis *Post-Dispatch*, St. Louis, Mo.

Marshall McLean, Camp Fire Club of America, 530 Madison Avenue, New York City.

Thomas N. Marlowe, chairman, State fish and game commission, Missoula, Mont.

Lee Miles, chairman, game and fish commission, Little Rock, Ark.

I. S. Myers, Akron, Ohio.

T. Gilbert Pearson, president, National Association of Audubon Societies, 1775 Broadway, New York City.

John C. Phillips, Wenham, Mass.

I. T. Quinn, commissioner, department of game and fisheries, Montgomery, Ala.

S. F. Rathbun, superintendent of game and game fish, 404 Bell Street, Terminal, Seattle, Wash.

George Shiras, 3d, 4530 Klingle Street, N. W., Washington, D. C.

The text of the announcement issued by the Department of Agriculture is as follows:

"SECRETARY HYDE TO REORGANIZE MIGRATORY BIRD BOARD

"In order to achieve a broader representation of sportsmen and conservationists upon the Advisory Board, Migratory Bird Treaty Act, and to obtain a large measure of local cooperation in the problems of conservation and enforcement, a reorganization of the board is being planned by Secretary of Agriculture Hyde. As a means of securing more direct regional representation on this board, the States have been tentatively divided into ten groups. These groups are so arranged as to give consideration to such matters as relative density of population and the similarity of conditions affecting migratory birds, as well as the various interests of those who are concerned in the welfare of these birds. A majority of the members of the board will be selected from these groups in cooperation with and upon the recommendation of the State conservation officials. In addition to the members representing the various groups of States, the Secretary will select and appoint a number of members at large.

"The Advisory Board is organized for the purpose of assisting the Federal authorities in a solution of regulatory problems in connection with the Federal administration of the migratory-bird resource. No criticism of any past board is intended by this action. In the past the Board has numbered among its members nationally-known sportsmen, naturalists, and conservationists, as well as prominent officials of the various State game and fish commissions and its work has been valuable to the Department, as well as to all other interests involved. The change is deemed advisable purely from the standpoint of obtaining wider cooperation and responsibility by regional representation.

"When constituted, the new Advisory Board will be requested to study and recommend definite policies upon all questions affecting the interests of the sportsmen and conservationists of the United States and falling under the jurisdiction of the Biological Survey, U. S. Department of Agriculture. Such subjects as length of seasons, bag limits, shooting restrictions, zoning, measures for increasing the supply of both upland game birds and waterfowl and measures for conserving the existing supply will be submitted to it."

Until the personnel of the new board is announced, and what may be even more important, until the policies that are to animate its decisions are learned, it would be both unseemly and futile to comment on any possible connection that may exist between these two public announcements. We can only hope, however, that the lot of the waterfowl and other wild life of the North American continent is to be no harder than it has been.

## Audubon Home

With wreckers already at work on porch and roof it looked as though the last home of John James Audubon were doomed to fall in the march of what we describe as progress. A hurried drive to save it had apparently failed. Mr. Harold K. Decker, amateur ornithologist and conservationist, thought otherwise, and even as demolition of parts of the dwelling—parts, fortunately, not original—was commencing he succeeded in arranging for underwriting the expense of moving the building and part of the cost of restoring it as it appeared when Audubon lived there.

Originally the building stood between 155th and 156th Street and Riverside Drive in New York City. Now it stands on a permanent site on city property at 161st Street, west of Riverside Drive. From this spot it overlooks the Hudson and the Palisades, as well as the new George Washington Memorial Bridge—a truly magnificent place for such a shrine. The transfer at the zero hour was facilitated by the cooperation of Samuel J. Levy, Borough President of Manhattan, and Walter R. Harrick, Commissioner of Parks, who aided in cutting red tape that had entangled the earlier movement in behalf of the building.

Now that this preservation has been accomplished there remains the necessity of restoration and establishment as an Audubon memorial. To this end The Audubon Home, Inc., has been organized with offices at 342 Madison Avenue, New York City.

By request, the financial sponsorship will remain unannounced for the present; directorate includes a number of leaders distinguished for their work and interest in conservation and education.

The Audubon Home, Inc., is a membership corporation. The classes of membership are as follows: Associate members $2 annual members $5, life members $100 fellows $500, patrons $1,000, founders $5,000, benefactors $10,000. Subscriptions may be sent to The Audubon Home, Inc. with offices at 342 Madison Ave., the National Association of Audubon Societies

# Helps and Hints FOR HOME AND GARDEN

## PLANTING THE GARDEN, MONTH BY MONTH

By Romaine B. Ware

The forehanded gardener is already up and doing even though the season is hardly started. Seed orders should be off by now as slow-growing varieties must be planted early. Snapdragon, vinca, lobelia, pentstemon, petunia and verbena are among those which require a long season to develop. Many amateurs do not bother with raising these slow-growing species from seed but rather purchase small seedlings a few weeks from now and grow them on, or buy plants when the time arrives to set them in the garden. On the other hand, where one has the time and patience to grow them a large number of plants may be had at very little cost.

There is still plenty of time to plant the great majority of seeds which must be started indoors. Under favorable conditions most seeds germinate in five to twenty days and in six to eight weeks are ready to set outdoors. If started too early they will be too far advanced before the season permits planting in the garden. Better results will be had with small vigorous seedlings than with tall spindling plants suffering from need of transplanting. Some things such as poppies, lavateria and eschscholtzia prove difficult to transplant and should be seeded right where they are to bloom; so there is plenty of time for these. Many other varieties of annuals do nicely seeded right in the garden when the soil warms up, but by starting them indoors several weeks are gained and flowers may be had much earlier in the summer.

As an alternative to starting seeds in the house, a hot-bed may be used, especially where large quantities are wanted. The usual hot-bed uses fresh horse manure as a source of heat, but in this age of gasoline the average gardener cannot always obtain manure as readily as formerly. Out in the Pacific Northwest there has recently been developed an electric hot-bed heater with thermostat control that seems to be much more efficient than manure hot-beds. Ease of operation, cleanliness and automatic temperature control are among the advantages claimed by those who have used them. Commercial growers also claim that seeds germinate much more uniformly due to constant heat and the exact temperature available. In propagating from cuttings much better results are said to have been obtained with the electric heat. These heaters are particularly suitable to the needs of amateurs and are available in units of various size.

Many gardeners wish to propagate their choice dahlias faster than is possible by simply dividing the clumps of tubers. This may be done by starting plants from green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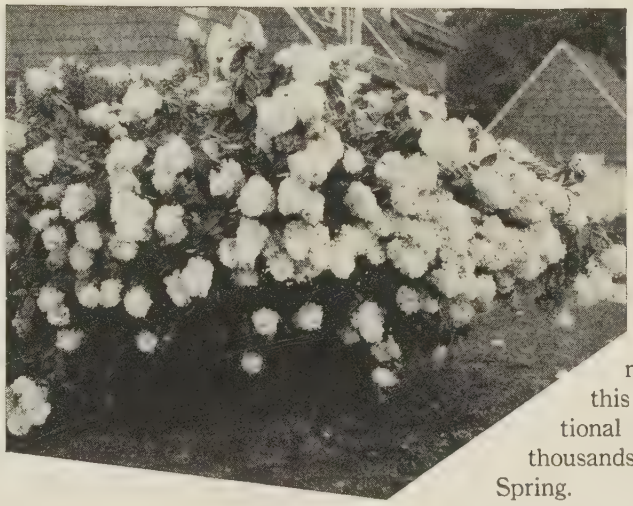

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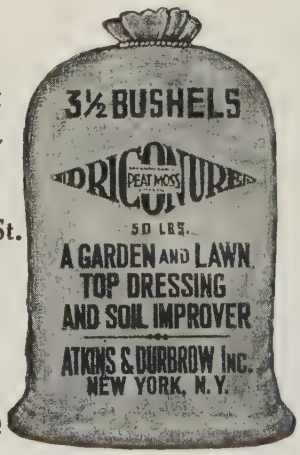


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cuttings taken in the spring. Right now the tubers may be planted close together in shallow boxes of rich sandy soil and by the middle of April cutting may be made from the shoots that will develop. Be sure the base of each cutting comes at a stem joint, as growers claim that otherwise the plants will not produce tubers even though they may bloom well. The boxes containing tubers need plenty of light, a constant supply of moisture and temperature of 55 to 60 degrees.

As the growth from hardy bulbs starts making its appearance above ground, it is time to begin removing the winter covering from your flowers. This should be done gradually and some of the material kept handy where it can be replaced should a late cold snap occur. When all danger of frost is past, the garden may be thoroughly cleaned up. Remove all dead leaves and stalks from the perennials. Plants of phlox, delphinium, hollyhocks and others likely to suffer from attacks of fungus disease will benefit by a thorough spraying with Bordeaux. Drench the crown of the plant and the soil around it. Repeated sprayings ten days or two weeks apart will pay if the disease has been prevalent in past years.

In line with the above it is well to anticipate the needs of your garden during the coming months. Spray materials should be on hand, your pump in readiness and some containers handy in which you can mix spray formulas. A delay of a few days when spraying is needed may result in untold damage to your plants. You should also have garden stakes and labels ready as well as measuring stick and line. Devote one corner of the garage or basement to garden supplies and equipment and then things will be handy when needed. Garden tools should also be ready as well as supplies of fertilizer.

Rose bushes, deciduous shrubs and trees (excepting evergreens) to be planted this spring must go in as soon as the soil can be worked. All should be obtained in a dormant state if possible. Evergreens, always moved with a ball of earth, are best transplanted later. Be sure newly-planted material does not suffer from lack of water. Their disturbed root systems are not able to function fully during the first few months after transplanting and they must not be neglected. All spring-planted trees and shrubs must be pruned back at least a third at planting time. Do not fail to do this as it is vital to the growth of the plants.

If your planting plans include lawn making this spring, it must be seeded as soon as the soil can be worked. Early fall is preeminently the best season for lawn making, but with careful attention to moisture and thorough weeding as soon as the weeds make their appearance, a good lawn can be made in the spring. If you cannot seed your lawn early, better wait till fall as grass does not develop well in warm weather. An excellent plan is to spend a great deal more time on soil preparation during the spring and summer and then seed in the fall. By the following summer you should have a real lawn.

Take up and divide all your chrysanthemums this spring. Single divisions or plants raised from green cuttings will give better results than older plants of any age. Most gardeners agree that plants grown from green cuttings made now and rooted in moist sand will produce the finest flowers.

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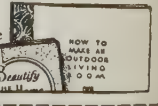



**NATIONAL HOME PLANTING BUREAU**
**831 Union Bank Bldg., Davenport, Ia.**

Gentlemen: Please send booklet checked below: Send 10c. ☐ "How To Make An Outdoor Living Room." FREE. ☐ "How To Plant The Home Grounds."

*Name*.....

*Address*.....

uttings three or four inches long with ost of the leaves stripped off will root adily if the sand is not allowed to dry t. In lieu of cuttings the outside rooted oots found around the old clumps may be rn off and each will produce a nice plant. dd some new "mums" to your garden is spring and late next fall you will enjoy al garden satisfaction.

As spring arrives and the clean-up urge ds us busy with the rake, we should alize that there is such a thing as cleaning too well. Among the shrubs and beneath dges it is much better to cultivate the aves and other mulch into the soil rather an rake it off. Any decaying vegetable atter such as leaves will add to the fer- ity of the soil. This is a good time to d plant food to the soil around your rubs. Raw bone meal, well worked into e soil, will supply food elements over a ng period as it decomposes very slowly.

As you clean up do not disturb the soil ound rhododendrons or azaleas. They have eat masses of fine feeding rootlets close the surface and cultivation is frequently tal. They need a constant mulch several ches deep of leaves or peat moss or both. ak leaves or those from other hard woods e good as most of them produce an acid action very necessary to the health of ese species. Keep adding to the mulch year year and your plants will reward you ith vigorous growth and liberal bloom.

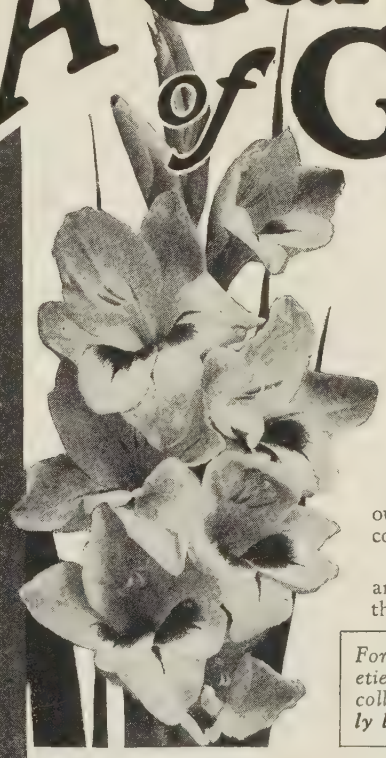
Through a large part of the country arch offers an abundance of wild flowers. ardens can also be gay at this season if oughtful planting was done last year, pecially from the great family of bulbs. he display of wild flowers throughout the untryside tempts many flower lovers to ove some of them to the garden. This ay be done very easily if reasonable pre- utions are observed. Don't forget that to cceed with wild flowers you must provide nditions similar to their native habitat. pecies from moist shady places will not rive in full sunlight and average garden il. Varieties that enjoy well drained cations and light sandy soil will soon rish in heavy, poorly drained locations. ou can make the wild flowers comfortable your garden if you will simply take the ouble to learn their requirements and then finitely provide for them.

And of course, as a lover of Nature and e great outdoors, you will avoid digging y large number of plants from any one cation. Be careful to leave enough to per- tuate the species. And don't dig up more an you can use or anything that you have t the place in which it cannot be made feel at home. As a general rule, small ecimens move better than large ones. nall plants are readily carried long dis- nces by carefully digging, shaking off most the soil, wrapping in a little moist oss and putting them in an air-tight con- ner. This will prevent the evaporation of oisture. Try it next time. Mr. Clarence liott, the famous English plant hunter, rs he has kept plants two weeks or more this method.


We Recommend the Horticultural Advertisers in these Pages



# A Garden Full of Gladioli for $2.00



**The Gladiolus** is one of the most satisfactory flowers grown and there is no reason why every family cannot enjoy this beautiful flower—it is of easy culture.

They bloom from July to frost if you plant a few bulbs each month from April to July.

For **Two Dollars** we will send **50 Bulbs** of our **Grand Prize Mixture,** which covers every conceivable shade in the Gladiolus kingdom.

Each year we sell thousands of these bulbs and have received numerous testimonials as to their merits.

*For those desiring Gladioli in separate varieties, so the colors may be studied, we offer a collection of **10 each of 10 varieties separately labeled for $5.00.***

**Order Your Bulbs Now** so as to have them to plant when you begin your garden.

*Our Seed Annual for 1932 sent on request.*

Stumpp & Walter Co

*Branch Stores:* White Plains, N. Y. Stamford, Conn.

132-138 Church Street NEW YORK

*Branch Stores:* Newark, N. J. Englewood, N. J. Hempstead, L. I.



## The Quickest Way To Sure Results with Hardy Plants

Reg. U.S. Pat. Off.

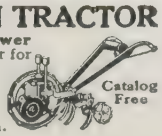
START right, right at the start. Start with only two-year-old, outdoor grown plants. Ones with plenty of roots, and none others. Such plants start growing at once and positively bloom first year. So far as we know, no one but Wayside Gardens grows and sells such plants, at the same price as others that are worth so much less. As a further insurance of success, each plant in our catalog has its own growing directions. Follow them and you can't go wrong. Send for the catalog. Buy Wayside plants. Make surely sure of insuring your success.

Wayside Gardens

MENTOR, OHIO



**KINKADE GARDEN TRACTOR**
**and Power Lawnmower**
A Practical, Proven Power Cultivator for Gardeners, Suburbanites, Truckers, Florists, Nurserymen, Fruit Growers.
**Low Prices - Easy Terms**
**American Farm Machine Co.**
1036 33rd Av. SE. Minneapolis, Minn.



Catalog Free

**VICKS Garden and Floral Guide**
Choice new varieties, old favorites, all about growing them. Flower and vegetable seeds, plants, bulbs. Money-saving special offers. **Write today** for this **Free** Book.
James Vick, 130 Pleasant St., Rochester, N.Y.
Free VICKS
"The Flower City"

# HERE ARE HURRY TREES

THE new Chinese (or Siberian) Elm (Ulmus pumila) is famous for quick growth and resistance to disease. Few people know, however, that in the Orient it is clipped into hedges as freely as we use privet in America. Where immediate screening effects are desired no better variety can be used. Beautiful as a single specimen as well, of course.

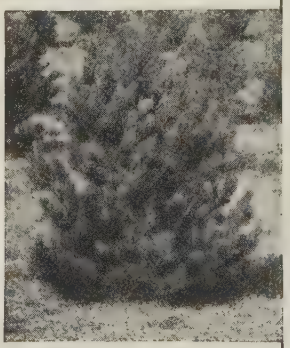
**Chinese (Siberian) Elm**

6 to 8 feet

**5 trees for $7.50**

(Larger quantities $135 per 100)

New England grown, from hardy North China seed



**RED PINE** (Pinus Resinosa—Norway Pine)

The one ideal evergreen for Eastern United States, thriving in almost any soil or exposure. It is one of the two or three quickest growing evergreens hardy in this climate, and is practically free from insect pests. A beautiful tree and with valuable timber.

**18 to 30 inches—twice transplanted, $22.50 per 100; $160 per 1000 (250 at 1000 rate).**

**Kelsey's Short Guide** to quality nursery products describes hundreds of attractive trees and shrubs; shows 60 colored photographs of plantings and specimens. A copy will be mailed on request.

**KELSEY NURSERY SERVICE**
Fifty Church Street, New York City


## A MOTHERLY KNIGHT IN ARMOR

(Continued from page 146)

distended; now and then, even when he was quietly resting, the emerald surface was troubled, quivered, and was quiet again. I returned frequently to the tank and watched him time after time make the circuit of the glass and back to his resting frond. He was restless and gave no time to feeding. His eyes kept turning, twisting, sometimes in rhythm or often independently as if they belonged to a span of horses. So I left him at midnight, slowly gliding on his rounds.

The following day, at ten o'clock, I saw the first sea-colt break from the paternal stable and rush across the aquarium. I chivied it into a narrow glass and watched it carefully for a long time. Its activity was prodigious and its position was ancestral. Never for more than a moment did it rear into a true seahorse posture, but was usually outstretched with tail trailing and head bent at only a few degrees, reminiscent of some pipefish-like forefather. Its heart beat vigorously and the great dorsal fin and the lower pectorals fanned the water and sent it swiftly ahead. The tail was the most amazing portion of its anatomy,—it coiled and uncoiled, stretched and drew back, but especially it lashed from side to side. More than any other movement of fin or head or body, this lateral stroke was characteristic. When it wished to attain ultimate speed, it was by lateral wriggling, and when it began to resent and be enraged at the constant bumping of its nose against the glass it twisted its tail into a veritable corkscrew, then undid itself and with the greatest ease astonishingly entwined the tip around its own snout, neck and fin. Now and then it opened its tiny tube mouth, and the short, broad hyoid bone would bend downward in an absurd resemblance to a very blunt, second lower jaw.

At four o'clock two more young seahorses slipped out of the opening of the pouch corral. This was distended and throbbing with life—the pressure and struggles of little heads and bodies being plainly discernible on the surface as intermittent dimples and bulges. A few minutes later a loud cry arose from my watcher and an instant after, with my hand lens, I was at the aquarium.

The parent Hippocampus had taken a firm grip with his tail around the branch of a sea-fern near the bottom and was swaying back and forth with head drawn in and the body and pouch pushed far forward. As I watched, the body was drawn back, and then, every muscle being brought into play, his whole being again strained forward. The upper third of the pouch which usually shows as a deep fold down the middle was now distended to the full, and in the center was revealed a small round orifice. As the pouch reached its utmost distention, the opening enlarged slightly and with a convulsive movement there was ejected a mass, a mist, a whole herd of young. They were thrown into the world in the shape of a rounded ball, which, like a smoke-ring or a bomb from a firework, held together as it moved rapidly upward and obliquely forward through the water. Only when it began to lose impetus, ten


# Burpee's Famous Flowers

**3 Packets for the Price of 1**

A special advertising offer to enable more people to learn the quality of Burpee Seeds. For only 10 cents you may have **your choice** of any three of the following packets (regular 10 cent size):

Giant Mammoth **Zinnias**, Mixed; Tall African **Marigold**, Double Mixed; Fordhook Favorite Mixed **Asters**; Burpee's Large-Flowered Double **Scabiosa**, Mixed; Little Gem **Alyssum**; Tall Mixed **Snapdragons**; Gorgeous Dwarf Mixed **Nasturtiums**; Tall Double Stock Flowered **Larkspur**, Mixed; The Burpee Finest Blend **Sweet Peas**; Early Single **Cosmos**, Mixed.

*Any three of these packets for only 10 cents (regular price 30 cents). Write us your choice.*

Burpee's Seeds Grow

**Burpee's Garden Book FREE**

This great Garden Guide describes all best flowers and vegetables. Many illustrations. Planting information. **It's free.** Write for your Book today.

**W. Atlee Burpee Co.**
**141 Burpee Bldg., Philadelphia**

# WATER LILIES

We supply everything for the Water Garden and Aquarium. Over 100 varieties of fish. Eighty shown in actual colors. Over 200 kinds of Aquatics. Special offer of Three Water Lilies, one red, one white and one blue sent for $3.00 postpaid in U. S. at proper planting time.

*Request a free copy of our catalog. Address*

**BELDT'S AQUARIUM**
2140 Crescent Ave., St. Louis, Mo.

TROPICAL & GOLD FISH

# Scott's Creeping Bent for Perfect Lawns!

Sod in six weeks. A rich, velvety stretch of lawn that chokes out weeds before they can grow! A deep, thick, uniform turf that's everlasting and that makes your home a beauty spot.

**The New Super-Lawn**

Instead of sowing seed, you plant stolons or the chopped grass—and in a few weeks you have a luxuriant lawn like the deep green pile of a Turkish carpet. Read all about this unusual grass in our illustrated booklet "Bent Lawns." Mailed on request.

**O. M. SCOTT & SONS CO.**
235 Main Street, Marysville, Ohio

## GLADIOLUS BOOK FREE!

Send for my new 36-page Gladiolus Book, describing 187 exquisite varieties, many new. Tells how to grow them. 45 illustrations. It's free!

**My famous beautiful RAINBOW COLLECTION** will delight you. 1 bulb each of 30 varieties (not labeled) all colors, blooming size, planting hints included, satisfaction guaranteed, $1.00 postpaid. Order today.

**H. M. GILLET, Gladiolus Specialist**
Box 458 New Lebanon, N. Y.

**EVERGREEN**—Rhododendron Max. Kalmia. Hemlock. Holly. Cedar. Azaleas and Flowering Dogwood. Seedlings 6-18 in. 50—$3; 100—$6; 2-4 ft. 10—$2.50; 25—$4; 100—$15.

**Locust Grove Nursery, Doeville, Tenn.**

# WATERLILIES

Give the modern tone to outdoor living-rooms. No other flowers are so easy to grow, nor return so much in color and fragrance. A tub or pool of Waterlilies and fancy fish will give more pleasure than any other part of your garden.

**Our New Catalog**

describes and prices many beautiful Waterlilies and rare fish for pools and aquariums. *Mailed free to points east of Rocky Mountains* (west of Rockies send 15 cts., Canada 20 cts. for catalog).

**THREE SPRINGS FISHERIES**
**113 N. Court St. Frederick, Maryland**

# Grow GLADS

MAKE your garden the envy of your friends with Gove's Sturdy Vermont Glads. Best of garden cut flowers —very easy to grow. Our special "get acquainted" offers will make you an enthusiastic "glad fan". Bulbs sure to bloom first year.

**100 Large Healthy Vermont Bulbs $3**

This collection includes at least 40 fine varieties, in many shades of Red, Yellow, Pink, Blue, Orange, Smoke, White, all fine ones but not labeled as to name. **50 for $1.75.** *All sent prepaid* with complete instructions for growing prize-winners. I believe this to be the finest "glad" collection offered anywhere.

*Send for beautiful illustrated catalog "that is different," listing over 300 of the world's best varieties.*

**CHAMPLAIN VIEW GARDENS**
ELMER E. GOVE
**Box E-6 Burlington, Vermont**

# 3 Regal Lilies 25c

**Mailed Postpaid For**

Most beautiful lily I ever offered. This gorgeous lily grows 2 to 3 feet high and bears a cluster of magnificent blooms, similar to Easter Lilies. A hardy variety— does well in any soil. Plant this spring— blooms in July. These bulbs usually sell for 25c each and this is a

**SPECIAL OFFER** Made to build New Business

I will mail postpaid 7 bulbs for 50c or 15 fine bulbs for $1.00. My new book on Seeds, Bulbs, Plants and everything for the flower garden mailed FREE.

**CHARLOTTE M. HAINES**
**Dept. 52 Rockford, Illinois**

# NEW YELLOW ASTER FREE!

I am developing a new **Yellow Aster,** a Newcomer in Floriculture, and call all Flower Lovers to my assistance in order to test it in all soils and climates.

I will send a **sample packet (20 to 30 seeds)** free to anyone who will grow them and report success.

I will also send my **45th Anniversary Garden Book of Bargain Offers,** describing over **900** varieties of **Seeds, Bulbs, Plants.** Write today for the sample packet of **Yellow Aster Seed** and **1932 Garden Book.**

**F. B. MILLS Seed Grower, Dept. B, Rose Hill, N.Y.**

## Wild Flower Pictures, Seeds

**48 colored postcards $1.00, 64 colored stickers or 48 trees 55c, 100 outline drawings 75c. Lantern slides and lecture 1 day $5.00. Motion picture $5.00 postpaid, free to chapters and affiliated societies having lantern. 150 kinds seed, 12 packets $1.00. List free. Arbutus 25c, fringed gentian 50c. Wild Flower Preservation Society, 3740 Oliver St., Washington, D. C.**

## Gladiolus and Dahlias

Rare, exclusive varieties giving you new garden beauty at small cost. Superior quality, healthy bulbs and seeds easily grown in almost every state in the Union. Write for our free 1932 catalogue. Many full color illustrations. New low prices.

CARL SALBACH
**640 Woodmont Ave., Berkeley, Calif.**


or twelve inches away, did it spray out into long streamers and scattered blobs of infant Pegasi. From the moment of slackened paternal impulse the individual seahorse motes assumed individual activity, swimming, twining their tails around themselves and one another, lashing out from side to side for all the world like diminutive crocodiles. With all this casual, indirective movement there was a steady stampede of each successive herd toward the surface; a scientist would describe it as positively phototropic.

Five more parental, H E ejections took place before the pouch was empty, and the fourth and fifth were both still ball-like, revolving slowly upward, while the earlier ones had spread out into a subsurface film of frisking young Hippocampi.

The pouch did not collapse as I expected it would, but for another half hour was only slightly shrunken. Yet the last of the young had emerged—three hundred and six in all. This was the end, and in the morning the parent's pouch was indistinguishable and the green color had given way to a suit of dark brown, starred with white and faced with yellow-green. And father and young were doing well.

The story was once told and has been repeated many times of how the young seahorses return, at the approach of danger, to their father's pouch. It is a charming idea but is quite untrue. There is no bond between offspring and parent once they are shot out of his pocket, and their instinct to swim up to the surface and toward the light is wholly unlike his ideas of a proper trajectory—which is down and among the protective fronds of seaweed. In addition to this the opening of the pouch closes tightly immediately after the multiple births, and precludes any readmission.

There is no doubt about the interest which the life of a dolphin must hold, and I am sure that the way of a mermaid in the sea would inspire a best seller, but for charm, for quiet success in life and for sheer unexpectedness of mating, incubation and birth the seahorse has no equal. As to the questions that arise: How did this intricate and reversed relationship first come about? Why does the female hand over her eggs? Why does the male parent shelter and incubate them? Why—I can only answer, I don't know.

---

### "Bear Loose!"

The man rushed hurriedly into the Museum at Yellowstone National Park. "One of your bears is loose!" he gasped, trembling with excitement. The ranger thought at first that he was joking, while the man in his turn failed to take seriously the information that bears in Yellowstone were allowed to roam in accord with their whim and fancy. Finally convinced, he went away avowing that he was taking no chances. His exodus from the park was immediate.

---

### Camp Directors Meet

The Camp Directors Association, composed of men and women whose profession is that of directing organized camps for boys and girls, holds its twelfth annual convention at Buck Hill Falls, Pennsylvania, on March 3 to 6, 1932, Frank S. Hackett, president, has announced.

Wonderful Collection 6 to 7 year trees, 1 to 1½ ft.
2 Mugho Pine (Dwarf)
2 American Pyramidal Arborvitae
2 Silver Fir 2 Canadian Hemlock

**Colorado Blue Spruce**
8-year old Trees, Sheared.....$1.50
7 to 8-year Trees, Each.....$1.25
All trees selected.

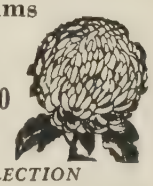
***Rhododendrons—Flowering Evergreen.***
Pink, Red and Purple, 3 for.....$1.25
1 to 1½-feet stock, well rooted.

***Nikko True-Blue Hardy Hydrangeas,***
2 for $1.10

**Cedrus Deodora**
Himalayan God-Tree
World's most beautiful evergreen. Sparkling Blue Foliage.
Heavy trees. 2 feet. This month only! Each . . . . . **$1.80**

12 Hybrid Oriental Poppies.....$1.20
6 Red Delphiniums, Cardinalis..... 1.20
12 Hardy Blue Salvia, Azurea..... 1.20
12 Assorted Perennials for Border..... 1.20
12 Assorted Perennials for Cutting..... 1.20
12 Assorted Perennials for Rockery..... 1.20
4 Assorted Rockery Evergreens..... 1.20

**Chrysanthemums Hardy Exhibition**
6 Field-Grown Plants **$1.10**
*Flowers 6 to 8 inches wide*



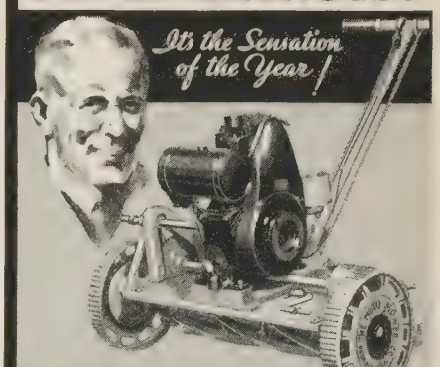
*YOUR SELECTION*
*Quaker Maid—White; Enchanters—Pink, Golden Lode—Yellow; Uneka—Bronze.*

**8 Pompons, Same Colors, $1.10**

***FREE*** *Any $1.20 collection listed FREE with any $5.00 order.*
*Special this month only.*
*Add 25c for Packing and Postage*

**NEW MARKET PERENNIAL GARDENS**
**45 Randolph Road, New Market, N. J.**

# Have you seen the new SUPER-DETROIT?




## The SUPER-DETROIT Moto-Mower

**A "Twist of the Wrist" Guides It**

**An exclusive, sturdy and powerful new motor—economical, efficient performance —selective automatic speed control— "twist of the wrist" guiding—ability to climb steep grades and make short turns —explain why you should let the brand new SUPER-DETROIT keep YOUR lawn luxuriant with minimum effort. Write today for catalog showing MOTO-MOWERS designed to cut every size of lawn.**

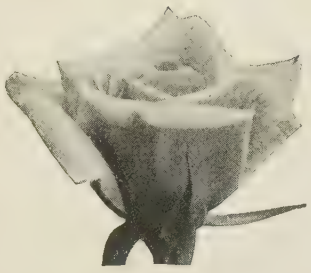
**The MOTO-MOWER Co.**
**4610 Woodward Avenue, Detroit, Michigan**

**Please send me FREE your 24-page catalog showing the entire MOTO-MOWER line in complete detail.**

**Name**_____

**Address**_____ **City**_____

# Roses



NEW Roses and rare Roses, originated in America, in England, in France, and Australia, are now grown in quantity by the producers of the "world's choicest nursery products."

In this group are Hybrid Teas of marvelous colors—golden yellow, vermillion, scarlet, silvery pink, cherry-red, and copper-orange. Here, too, are Climbing Roses, brilliant in color and most desirable in habit.

In addition to these new Roses, there are many worthy and popular varieties, indispensable in every garden of Roses. All these Roses—new or old—are modestly priced.

**Here we mention a few of the new Roses that have been introduced in America recently.**

*Hybrid Teas*

**Autumn.** Bright yellow.
**Helen Fox.** Golden yellow.
**Mrs. Sam McGready.** Red.
**Olympiad.** Blood red.
**President Deville.** Red.
**Mrs. Beatty.** Soft yellow.
**Roslyn.** Golden yellow.

*Climbers*

**Henry Linger.** Yellow.
**Royal Scarlet.** Hybrid.

*Hybrid Rugosa*

**Dr. Eckener.** Pink, suffused gold.

*Polyantha*

**Johanna Tantau.** Rosy white.

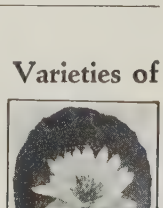
ROSES
*by Bobbink & Atkins*

is more than a catalog—it is a text-book on the best Roses for modern gardens. Nearly a thousand varieties of Roses are listed; their merits and demerits are freely discussed; all varieties are classified and arranged to make selection and ordering easy. A copy will be mailed free on request to those who intend to plant Roses. (A charge of 50 cts. must be made for catalogs sent west of the Rocky Mountains.)

**BOBBINK & ATKINS**
**Rutherford** **New Jersey**



**Choose from Our 75 Varieties of Beautiful**
**WATER LILIES**



These richly colored, fragrant, easy-to-grow garden flowers may be planted from April until the last of August. Ours are the largest Aquatic Gardens in America. Every root *guaranteed!* 75 beautiful Varieties from which to make your choice in our free, illustrated Catalog. Send for it NOW.

**The W. B. SHAW Aquatic Gardens**
**Dept. A, Kenilworth, Washington, D. C.**


## National Park Gains

A net increase of 9.18 percent of visitors to the 12,542 square miles of National Parks, progress in road-building, park administration and private land acquisition, and great strides in the extension of Park Service educational activities, mark the high-points of achievement in park work, Horace M. Albright, director of the Service, told Secretary of the Interior Ray Lyman Wilbur in his annual report. Although rail travel decreased, automobile travel gained more than enough to offset the loss, the director pointed out. Two measures bringing the parks closer to the ideal standards set for them passed Congress during 1931; one abolished the sub-standard Sullys Hill National Park in North Dakota; the other repealed certain portions of the organic park acts that permitted uses of the parks inconsistent with their real purpose. Despite the fact that the last year was one of grave fire hazard, the conflagrations have been held to a minimum within park boundaries, Mr. Albright stated.

## Birds Endangered

Vigorous protest against the proposed overhead high tension line to be erected by the Niagara and Hudson Power System has been voiced by the Westchester County Conservation Association. Its executive committee unanimously adopted a resolution pointing out that this line would be a distinct menace to human life where it crosses highways and thickly settled sections; that the leakage of current is injurious to vegetation and the wires fatal to bird life; that the steel carriers are unsightly and that the right of way of the line will mean ugly gashes in the landscape. The objection has been lodged with the Board of Supervisors of the County of Westchester and the Public Service Commission.

## Water-Fowl Crisis

A call for private philanthropy to create wild-life sanctuaries and remedy the critical water-fowl situation before public sentiment forces legislation to prevent hunting was made recently by T. Gilbert Pearson, President of the National Association of Audubon Societies. He urged men who used to hunt "to repay to the Nation, in the form of living birds, the sport afield which they have enjoyed during their more active years," and suggested that the owners of shooting preserves might turn these into sanctuaries for the preservation of wild life.

## Essay Contest

High school juniors and seniors have an opportunity to enter an interesting essay contest announced by the Gorgas Memorial Institute, 1331 G. Street, N. W., Washington, D. C. The subject this year is "Mosquitoes: Their Danger as a Menace to Health and the Importance of Their Control." Medals will be awarded to high school winners, cash prizes for State winners and larger prizes in the national contest. Students should ask the principal of their school about the contest or write the Institute about it. The contest opened February 7 and closes March 15.


**5 FINEST MONTHLY ROSES $1.95 POSTPAID**

**FREE** a 2-yr.-old FIELD-GROWN bush JULIEN POTIN (Golden Pernet) with all orders for both GROUPS A & B.

**Collins "Faultless Five" for 1932**

**$1.00 GLAD Offer**

36 big plump bulbs, 2¼ to 5½-in. circumference GUARANTEED to bloom this year. Big blooms—all colors and types—includes dark garnet NEOGA, ruffled salmon pink MRS. FRANK PENDLETON, dainty DORRITT, glowing MRS. KEUR, rare orchid and pastel shades. 36 for $1 postpaid.

**GIVEN WHILE THEY LAST**

36 additional big bulbs, large-flowering glads with each order glads and roses totaling $2.95.

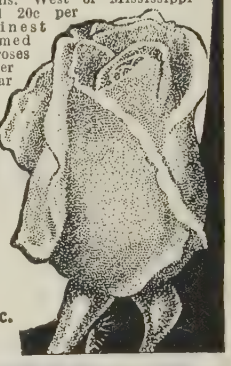
**GUARANTEED** to grow and bloom

Sturdy 2-yr. FIELD-GROWN bushes of finest fragrant everblooming roses, below:

**A** **Etoile de France**—rich crimson
**Sunburst**—vivid golden yellow
**Imperial Potentate**—pink
**K. Augusta Victoria**—white
**Mme. Butterfly**—pink and gold

**B** **Red Radiance**—vivid red
**Claudius Pernet**—all yellow
**Radiance**—bright rosy carmine
**Betty**—copper-rose, gold tint
**Los Angeles**—coral-yellow and flame-pink

Either group above (A or B) costs only $1.95, delivered when planting season opens. West of Mississippi River, add 20c per group. Finest long-stemmed fragrant roses all summer and fall, year after year.



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## English Against Traps

In a recent issue of *The Fur Crusade*, an English publication devoted to the cause of tortured furbearers, Major Charles Van Der Byl reports that the National Federation of Women's Institutes at its annual 1931 meeting determined to call upon the women of England to buy only humanely farmed furs, or other furs humanely obtained, and so to discourage the cruelty of present trapping methods. We wish the British organization success in its valuable work, and *The Fur Crusade* real power in moulding public opinion. The inhumanity of steel-trapping is permitted only because fur-buyers do not fully realize the situation they are helping to perpetuate. Once they awake to the real facts, the trapping industry will be much more depressed than it is at present.

## Mother Love

All are familiar with the old trick of a mother partridge of feigning a broken wing to attract attention to herself and away from her young. The experience of Oscar H. Bauer of Hartford, Wisconsin, reveals what her next move is should her ruse be unsuccessful. He was afield searching for ginseng and golden seal during the late summer, and managed to capture one of the chicks of a flock after the mother partridge had failed in her attempt to lure him away. In some inexplicable way, the mother knew of his capture. She passed back and forth within ten feet of him, screaming, fluttering her wings, and then trailing one of them as if she were in pain. Mr. Bauer decided that the mother's courage deserved reward, and freed the offspring.

## Teaching Nature Studies

A booklet of suggestions and ideas for the Nature study teachers of the early elementary grades has recently been compiled by the Research Committee of the Michigan Association for Childhood Education. It follows a seasonal arrangement, and concludes with a valuable bibliography covering the field. The contributions to it have been made by Nature teachers in Michigan schools.

## Caring for Peafowl

Growers of those interesting and ornamental birds, the peafowls, will be interested in Miscellaneaus Publication Number 127 of the U. S. Department of Agriculture, in which W. L. McAtee discusses the range, history and habits of these birds and gives many helpful pointers as to their propagation and care. The pamphlet is obtainable at the Government Printing Office from the Superintendent of Documents at five cents.


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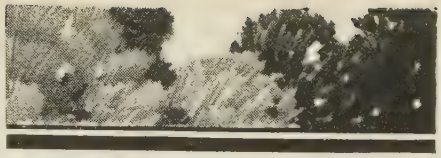

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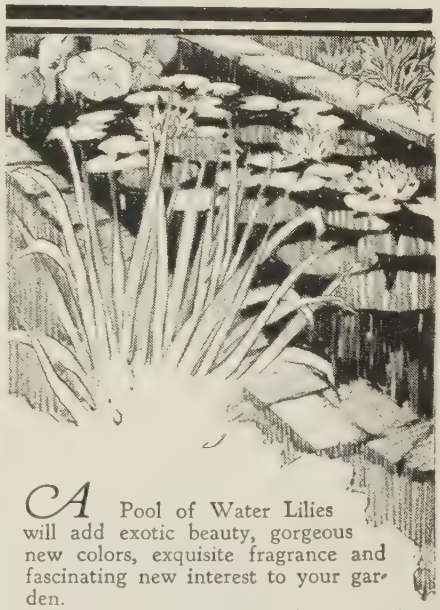

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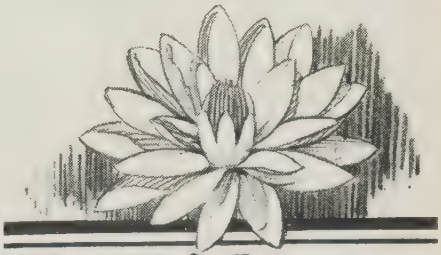

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## Flower Poster Wanted

The Wild Flower Preservation Society of Washington, D. C., is seeking an attractive outdoor sign to carry the message of flower protection across the country. Some such wording as "Protect Rare Wild Flowers" or "Protect Wild Flowers" should appear on its face, although the wordings suggested have not satisfied the Society as the best that can be obtained. P. L. Ricker, National President, invites further suggestions from flower lovers. The wording finally chosen will appear on heavy metal signs in green and white, ten by fourteen inches, and will be used in all parts of the nation.

## Cecropia Eggs

The Cecropia moth mentioned in the October issue of Nature Magazine that laid 209 eggs fell far below the world's record in her achievement, according to C. Wm. Wurster of New York, who is engaged in the breeding of butterflies and moths on a commercial scale. He reports that fourteen out of sixteen matings made last season in his plant resulted in a larger number of eggs. One female laid 420 eggs. Ten deposited more than 250 eggs, five more than 300, four more than 350 and 2 more than 400 eggs. The lowest number laid by any of the sixteen females was 172.

## Training Dogs

Here is an excellent book for the owner or prospective owner of a dog. It bears the title *Our Dogs* and is written by C. E. Harbison, who says in his foreword that "this book is written with the desire to make the world a better place for 'our dogs'—your dog and mine. It is intended to show that when the dog of any breed is treated with the same consideration and respect as regards feeding, grooming, housing and training as would be shown a human being, he will be a desirable pet and companion, or fulfill whatever purpose for which you keep him." The author proceeds to give valuable advice in support of his objective and does a thorough-going job of it. After one has read this book he'll be a better master, which we all should wish to be. The publishers are Orange Judd Publishing Company, 15 East 26th Street, New York City, and the book is listed at two dollars.

From the presses of the same publishers comes another excellent dog book, *The Ideal Boston Terrier,* written by Josephine Z. Rine. This author should be well known to many readers of Nature Magazine, since she has contributed to its pages in the past. She writes with a knowledge and understanding that could come only from one thoroughly acquainted with her subject. In this book she deals exclusively with the history, breeding, selection and care and management of Boston terriers. The volume should be in the hands of every owner of a dog of this breed, or one who hopes to own one. The book is listed at two dollars.


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## Changing Climate

The extraordinarily warm, open and snowless weather which prevailed throughout the northeastern United States, during the present winter, up to the middle of January, anyway, subject to what may happen for the rest of the calendar winter, has excited all sorts of discussion as to the causes of this phenomenon. It has been notable in the Highlands of the Hudson, where, ordinarily, there is a noticeable difference in temperature and snow conditions from the weather in New York City, forty miles south. Where, ten or twenty years ago, a total snowfall of three to five feet, in the Highlands, was usual, this winter, up to mid-January, there had been only a few inches, and that limited to higher elevations and to the interior of the mountains, while the Hudson shores remained bare. The ground had not frozen, except for a very slight depth and that only for a few days. The lakes in the interior of the Park, at levels around 1000 feet above the sea, froze for a few days, around New Year's, but soon melted in the warm weather following, and in mid-January there was no natural ice for skating anywhere in the Highlands. The only public skating to be had in the lower Hudson Valley communities was on the large artificial indoor rink at Bear Mountain, Palisades Interstate Park, which has been thronged with skaters in consequence.

All sorts of theories have been offered to account for this open winter, from sunspots to the shifting of the Gulf Stream. The most plausible explanation and one that seems to be accepted by the veteran New York City weather forecaster, Dr. Scarr, is that the climate of the northern hemisphere is becoming generally warmer because of the melting of the polar ice sheets and glaciers, due to the fact that the earth is still undergoing a swing back from the last ice age, when the continental ice sheets advanced as far south as New York Bay and covered the Highlands of the Hudson 2000 feet deep. Whether the ice sheets are going back and disappearing for a long time, geologically speaking, and the world is entering a period of relative warmth; or whether we are in an inter-glacial period, such as occurred several times during the Pleistocene Epoch, the time of the last great ice age, and sometime in the next 25,000 or 50,000 years the ice will gather again and creep south and again bury the northeastern part of North America, is a question which our posterity will have to determine.

But, apart from the obvious fact that the last few winters have shown deficiency in snowfall, and higher mean temperatures, there is another interesting line of evidence as to a warming climate. This is a botanical phenomenon: the fact that "islanded" remnants of the flora which existed here not long after the ice sheets began to melt and while the climate was slowly warming from an Arctic state are gradually disappearing, and seem destined to obliteration if the supposed swing back from the last glacial advance continues.

When the front of the last advance of the ice stood at the terminal moraine, now shown in its dump heaps of gravel, sand and clay, from Long Island, across New York Bay, and across northern New Jersey and northeastern Pennsylvania, vegetation north of the moraine was practically nonexistent. As the ice began to melt, the higher summits first appeared bare, at least during the summers, and gradually there developed thereon a primitive flora of lichens, algae, then mosses and liverworts, and at length, sturdy alpine plants, largely in the heath family, on the cold, bare rocks just uncovered by the melting of the glacier ice. As the lower elevations became bare from further melting, trees, herbaceous plants, ferns, and other species flocked in from South Jersey and Pennsylvania and took over the land. As the climate grew warmer, a cold temperate and at length a mild temperate flora prevailed. The species now found in plenty in the far north migrated toward the pole, except a few colonies which climbed to the summits and to high cold swamps and bogs of this region. There they remain, still holding on in these relatively inhospitable spots, which have not been overrun by the mild temperate zone flora which generally prevails in the Hudson Valley.

There is evidence, however, in the Highlands of the Hudson, and in other mountain areas in the northeastern United States, that these "boreal islands," of northern species of plants, and to a lesser extent of small animals and insects, are slowly but inexorably diminishing, under the continuously warming climate. Even in the period when the ecological relations of plants to their environment have been understood and studied, within the past 50 or 75 years, these boreal islands have been visibly affected by the invasion of lowland plants, and collateral evidence indicates that since the first human settlement of the Highlands of the Hudson, two centuries ago, and the consequent disturbance of natural conditions and of sanctuaries for unusual species, survivors of the northward migration, the change has been still more extensive.

Consider trees, for example. Three hundred years ago, the spruce was frequent in high, wet valleys in the Highlands. The American larch, or tamarack, was occasional. So also was the arbor vitae or northern white cedar. Now the only place where the spruce and larch may be found in this region, west of the Hudson, is at Spruce Pond, on the western border of the Harriman State Park, near Southfields, N. Y. Where it was cut by man, in the course of general lumbering, its precarious hold, weakened by the changing climate, was destroyed and it did not return. Arbor


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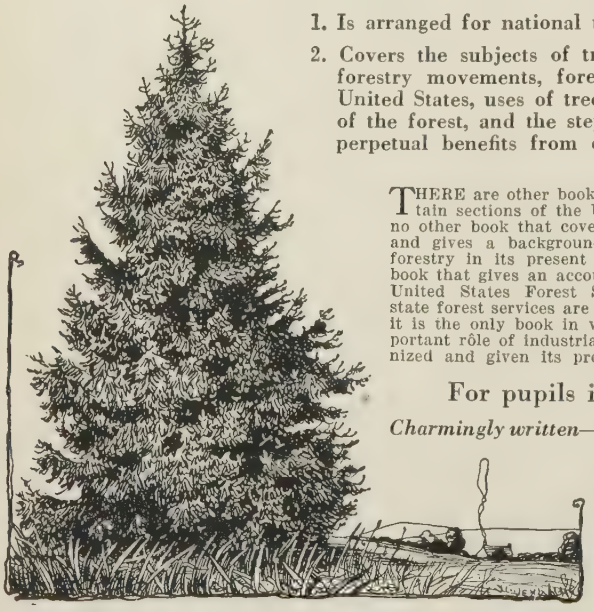

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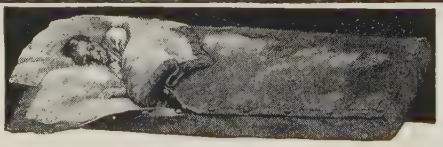

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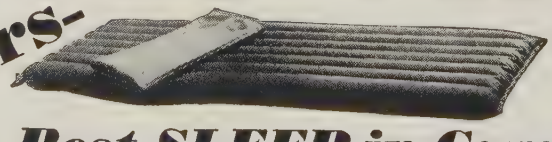

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vitae once grew in the high valley now occupied by Lake Tiorati, in the center of the Harriman Park, as evidenced by the old name, Cedar Pond, but did not return after cutting and is not now found growing naturally in the Hudson Valley until thirty miles north of the Highlands.

Flowering plants, such as the goldthread, the bristly sarsaparilla, the twisted stalk, the painted trillium and clintonia, and shrubs like the leather wood and witch hopple, which have hung on, in these high boreal islands in the Harriman Park, despite successive cuttings and frequent forest fires, are growing perceptibly less in numbers in recent years as species of milder temperature zones are gradually invading them.

With the retreat from this region of the majority of Canadian or sub-Arctic species which once flourished here, except these few rear guard survivals in high, cold places, obviously destined to ultimate obliteration, has come another floral phenomenon, the advance of warm climate species from the south. It is shown in only a few species so far, yet it is suggestive of later increases, if the swing to a generally warmer climate goes on. Among these few southern species is the prickly pear cactus, which may be found in a number of places in the Bear Mountain and Harriman Parks; on the rocky knobs in the salt marsh at Iona Island; on Bear Mountain; and on the Tor Ridge, outside the park, west of Haverstraw. It looks very odd among the deciduous oak, birch, tulip and maple woods. Another, doubtful as to origin, whether naturally seeded by migrating birds or derived from nearby cultivated individuals, is the stand of a dozen southern bald cypress, at Manitou station, opposite Fort Montgomery, a tree not normally found north of Virginia, yet obviously flourishing on the Hudson shore.

Old winter may even up for this warm weather, this year or the next, but for the last few seasons, something seems to be happening to moderate our usual December to February temperatures and snowfall.

## A Call to Arms

This is the title that F. L. R. Roberts gives to an article that features the latest issue of *Iowa Bird Life,* quarterly of the Iowa Ornithologist's Union. He declared that "this year even shot-gun conservationists agree that the killers have gone too far. The Iowa Fish and Game Commission, which, by the way, now seems to be really in favor of conservation, at least as far as saving the game species is concerned, says that it would have been better if there had been no open season at all."

Mr. Roberts urges all sincere conservationists to spread the word; to see that people continue thinking in terms of conservation. He lists certain pressing needs, and we are glad to echo his call to arms by reprinting them here.

"I. Our birds of prey are being exterminated. Many of them are extremely useful. Only three or four species are harmful even when abundant, and they have almost disappeared from our landscape. Very few shooters can tell one species from another and so would do more damage than good, even if harmful species were more abundant.

"II. There should be no open season at all on Jacksnipe. These birds are very rare.

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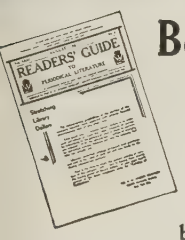


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Very few hunters can tell one shorebird from another, and so kill off those which are protected. I met three hunters at a slough near here this fall. I saw them shoot and go and bring in some dead birds. I went out and asked them what they had shot. They replied, 'Jacksnipe,' but would not show the dead birds to me. 'They are like those out there,' they said, pointing to some Black Terns that were resting on the shore.

"III. Woodcock are practically extinct in Iowa. A query from the Fish and Game Commission as to whether they were all extinct brought about a dozen replies from people who said they had seen them this year. But we may judge the value of these observations when we consider that one of these observers wrote, 'When these birds first flew up I thought they were what we call Jacksnipe (Some call them Killdeer).' Is this observer to be trusted when he doesn't even know that the Wilson Snipe or Jacksnipe and Killdeer are distinct species?

"Iowa has an open season on Woodcock, though it is not legal to hunt them here now because of federal law. Our law should be changed now for some of the rich gunning clubs of the East may tell the Biological Survey to change the federal law, which is now the only protection of the Woodcock.

"Let us not sit idly while these birds that we profess to love are being destroyed. If you have never done anything before, bestir yourself now. Your local paper will be glad to publish something on these subjects from the pen of a subscriber. I am hoping for a hundred articles during the next two months. We should and could have a thousand. Don't say that the situation is not critical or does not need your help. Such a statement would mean simply that you were not informed. Even the hunters themselves now admit that the situation is critical. Of course they 'pass the buck' and ascribe as a cause for the crisis all sorts of reasons other than the real one, too much shooting. What will you do? Will you 'pass the buck?' If you do nothing, will your hands not be as bloody as those of the killer when these birds are exterminated?

"If you care for more information on these subjects and do not know where to get it, I shall be glad to recommend sources. My address is 419½ S. Governor St., Iowa City, Iowa."

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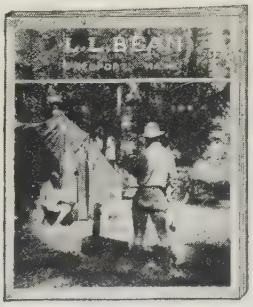


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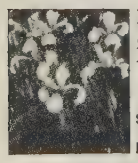

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## NATURE STUDY AND THE RADIO

BY ALICE KEITH

Broadcasting Director
American School of the Air

Nature study is slowly but surely finding its way into the field of educational broadcasting. Although the only real way to study Nature is at first-hand, still radio can do much to stimulate an interest.

Thornton Burgess has given a series of highly interesting talks in the New England District and various local broadcasting stations have devoted certain periods to phases of Nature study, such as astronomy, a subject which always makes a strong appeal to the adult public.

The American School of the Air, broadcast over a chain of seventy-three stations to the schools of the United States, is for the first time introducing Elementary Science into its curriculum. A series of ten broadcasts have been planned for the intermediate grades with subjects such as "Some Wonders of Nature," "The Sun and Its Family," and "The Surface of the Earth." These programs are listened to by thousands of children throughout the United States. They are in the form of a dialogue between a teacher and a child. The final broadcast of the series, on April 7, is to be devoted to "Animal Rarities Found in our National Parks." Dr. H. C. Bryant, Assistant Director of the National Park Service, will have charge of this particular period.

In order to make the Nature study broadcasts of real value, the teachers' manual of the American School of the Air contains line drawings which are to be copied on the board before each broadcast. Although the method of presentation and reception of these broadcasts in the school are still experimental, they have proven so far to be most successful when properly handled in the classroom.

Three years ago, the American School of the Air presented two interesting lectures by Thornton Burgess on the subject of birds and animals. During the summer vacation, Dr. Bertha Chapman Cady presented weekly talks as a summer extension of the American School of the Air. Each subject discussed, such as Birds, Water, Insects, the Sky, etc., was accompanied by a program of descriptive music interesting to boys and girls in camp. This type of program is planned for next summer and will probably be broadcast over the Columbia Broadcasting System.

Any teacher of Elementary Science or any Nature lover who is interested can receive a copy of the American School of the Air manual by writing to 485 Madison Avenue, New York City.

A complete list of the American School of the Air programs follows:

November 19—Some Wonders of Nature.

December 10—The Sun and Its Family.

January 7—The Earth and Its Neighbors.

January 21—The Ball on Which We Live.

February 4—The Surface of the Earth.

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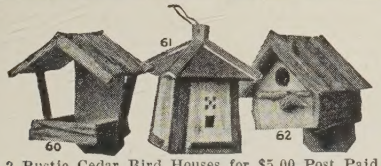


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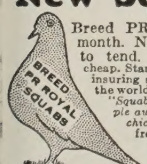


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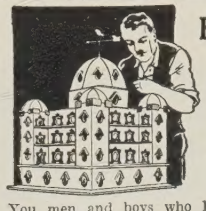

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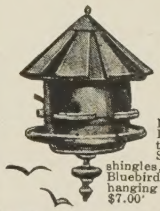

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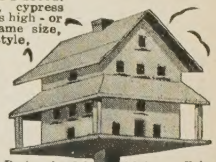

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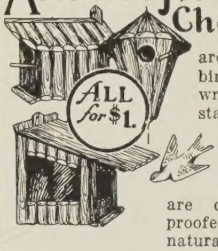


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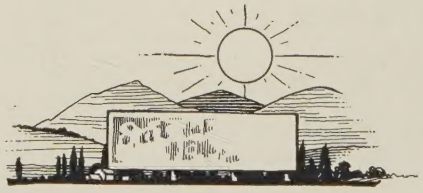

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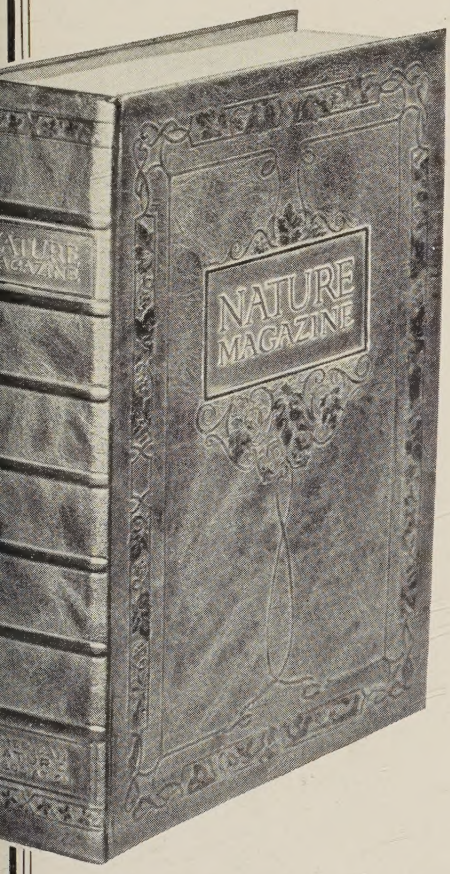


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